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SAN FRANCISCO, CA

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JAN. - DEC., 1908

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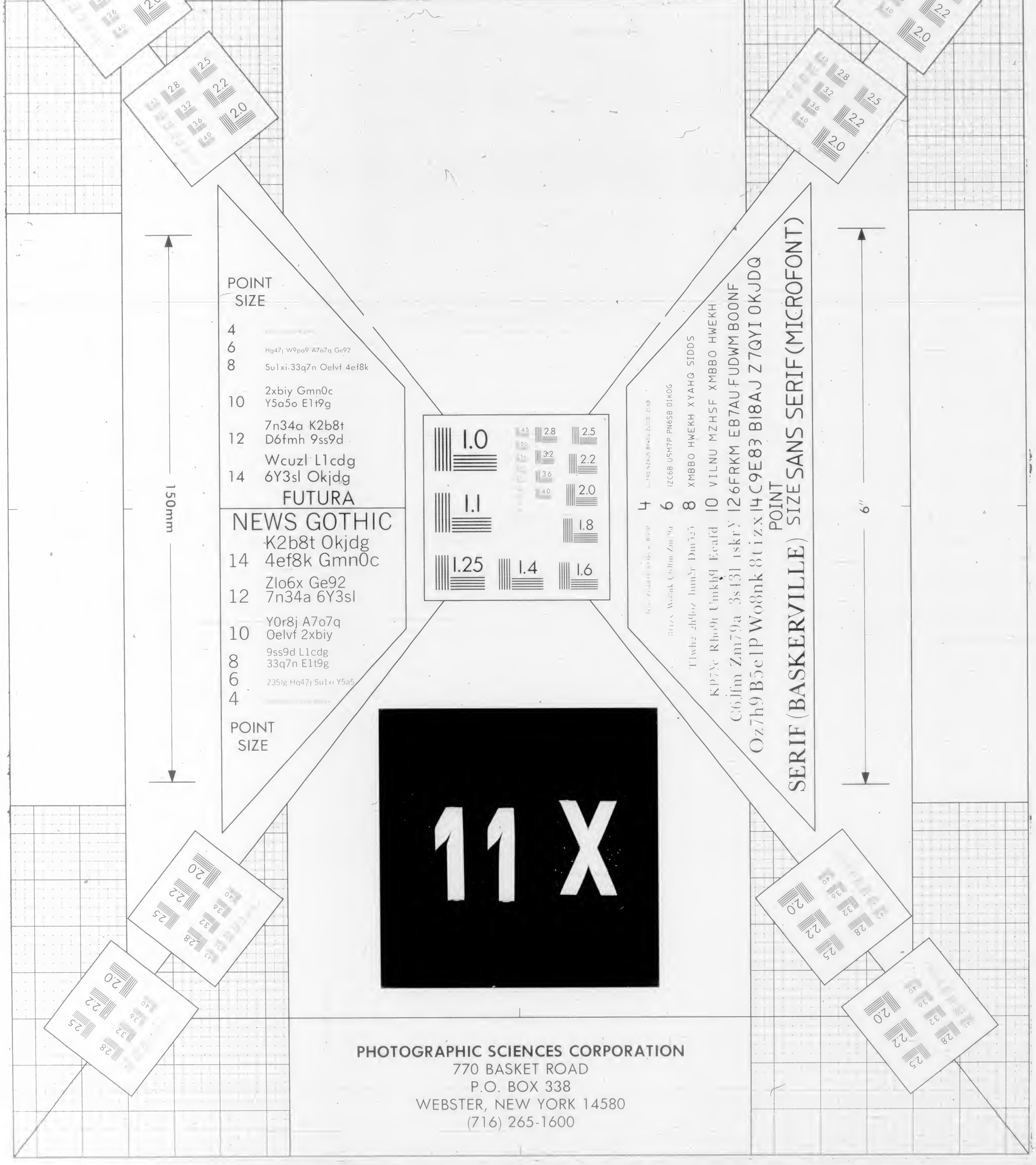

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VOLUME

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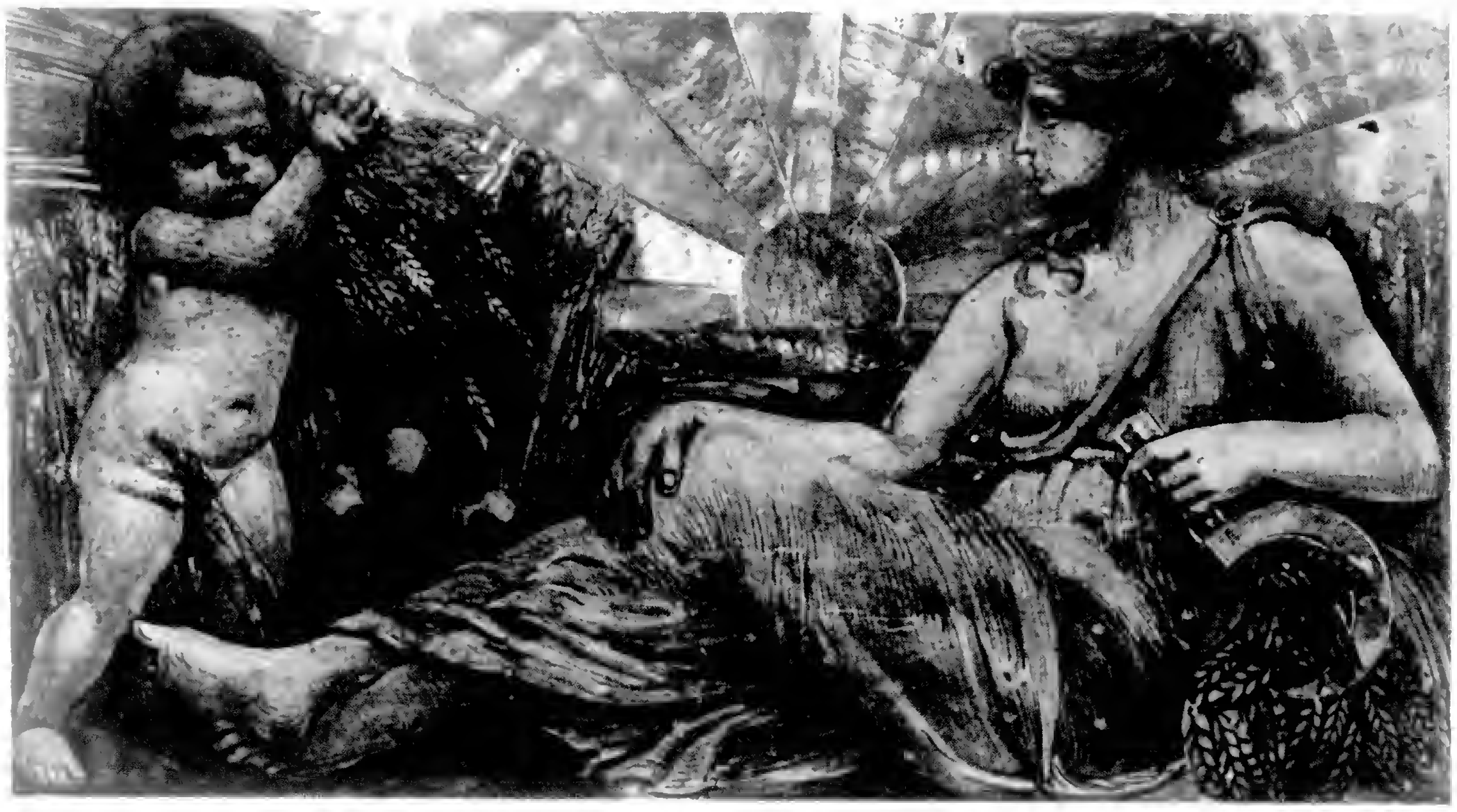

Vellucent Panel, "Ceres"—painted by Granvel Fell. Cedric Chivers, Bath, England
Shown at the Portland Exhibit —*William W. Kellogg*

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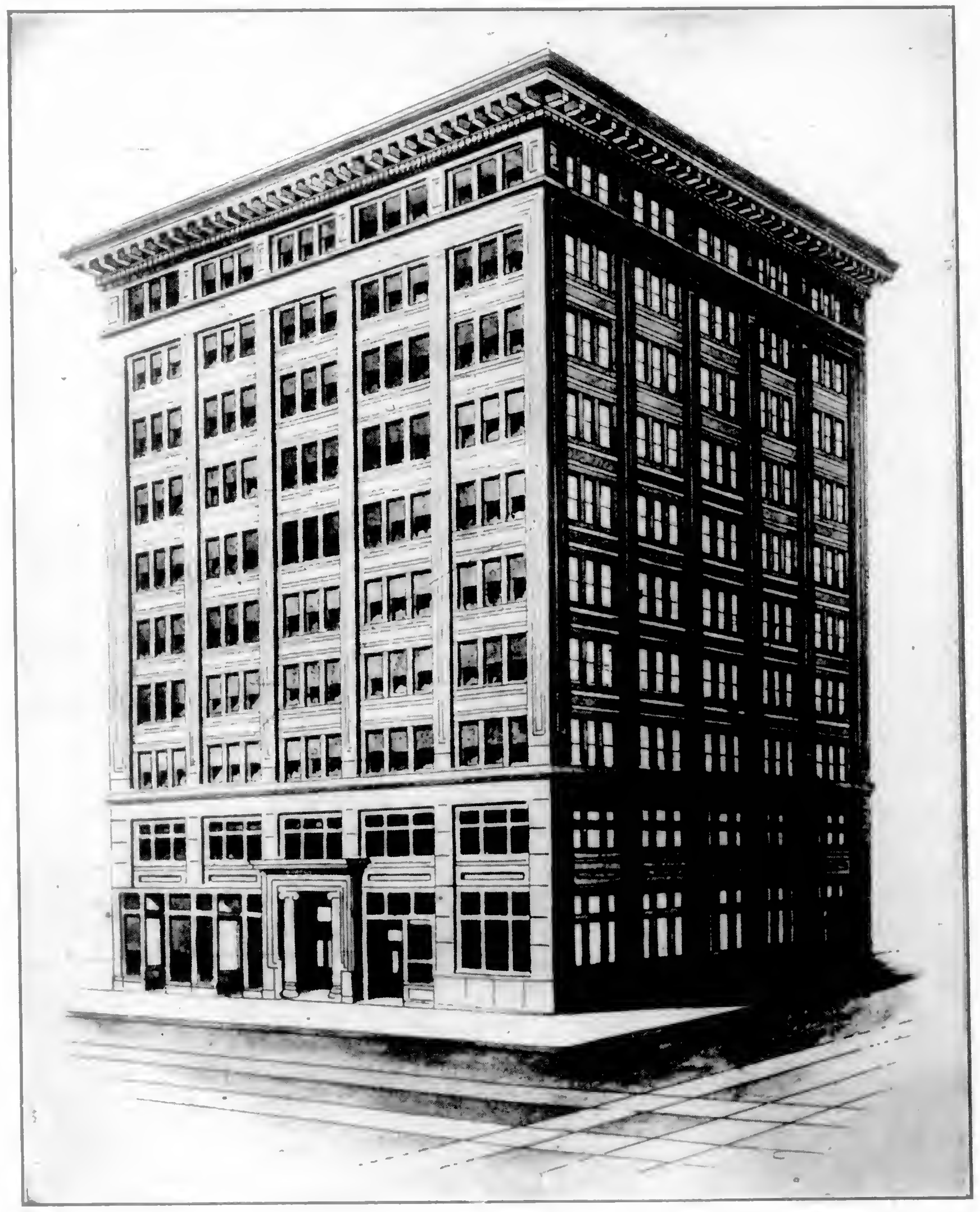


The Corbett Building, Portland, Oregon
Whidden and Lewis, Architects

Frontispiece, The Architect and Engineer
January, 1908

Equipped with Otis Elevators

THE
Architect and Engineer

Vol. XI. JANUARY, 1908. No. 3

The Work of W. M. Whidden and Ion Lewis, Architects, of Portland, Oregon

By HERBERT BOOTH KING.

IT IS pleasant in these days of commercialism, the spirit of which has extended even to the Arts, to chronicle the history of a firm which has adhered strictly to the ethics of its profession and built up a success along the lines of probity and just treatment for all; or as Lowell expresses it, a policy based on "all that's honest, honorable and fair." If there is a dissenting voice in Portland regarding the upright character of the firm of Whidden & Lewis, we have not heard it. Their honorable career sets an example to the younger architects who are just starting in their profession and who might be tempted to depart from the straight course which has brought honor and fortune to the subjects of this sketch.

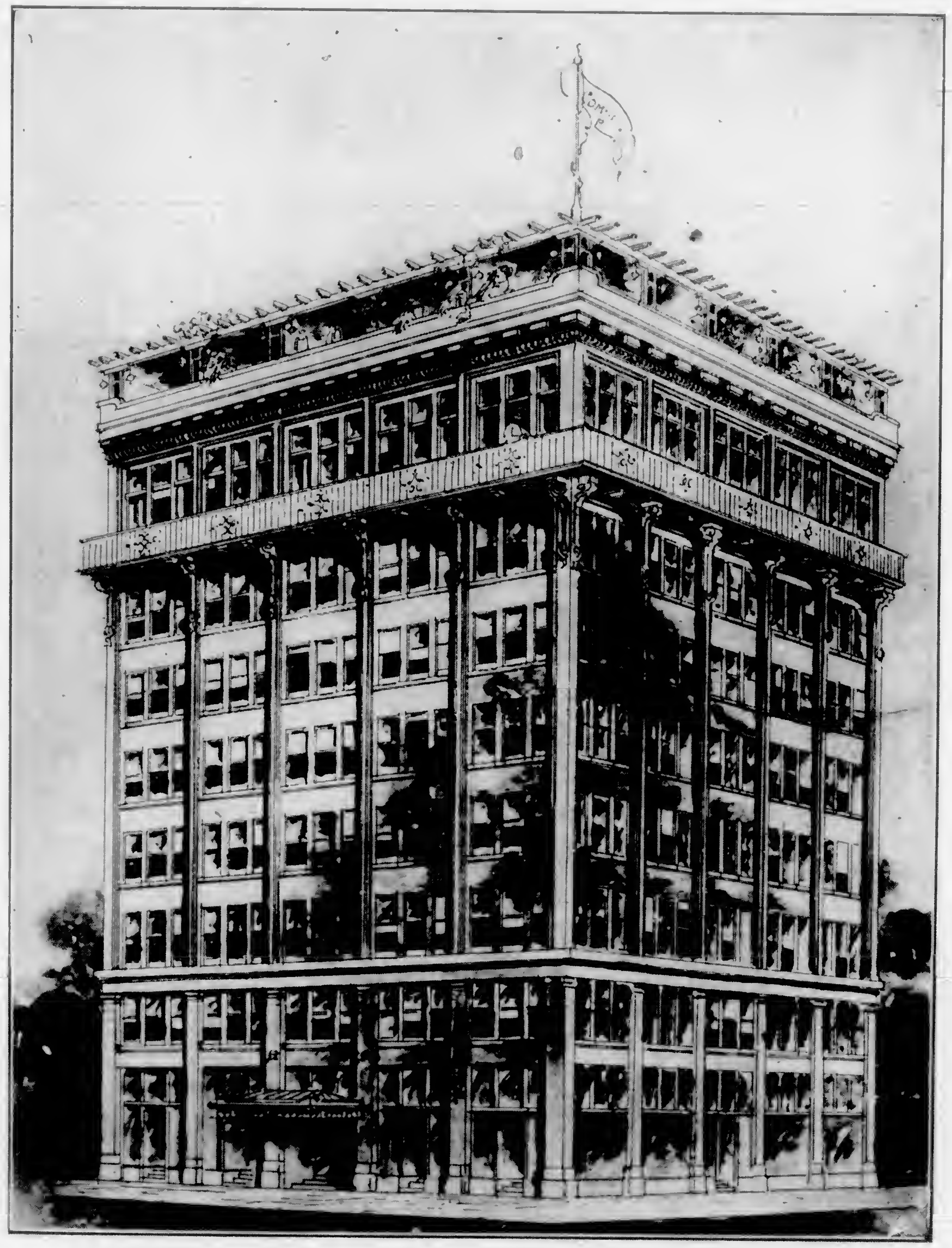
> "Love well thy work, be truthful in the mart
> And foes will praise thee when thy friends depart."

W. M. Whidden came to Portland in 1881 as a representative of the New York firm of McKim, Mead & White, to superintend the construction of the Portland Hotel. Work on this building was suspended after the foundation was laid and it was not until five years later that, under the vigorous management of the Portland Hotel Company (of which the late Henry W. Corbett was president), which had purchased the then so-called "ruins," that word was given to go ahead with the construction. Mr. Whidden, who had been recalled to New York, now returned to Portland and began practicing under his own name, with this important building as an initial order.

Ion Lewis became associated with Mr. Whidden several years later. They are both New Englanders and originally residents of Boston, where Mr. Whidden's father had an extensive business as a building contractor. Mr. Lewis, previous to removing to Portland, was located in Chicago.

Mr. Lewis was appointed Director of Architecture at the Lewis and Clark Exposition, and the Forestry Building—one of the star attractions at the Fair—

Hotel Portland, Portland, Ore.

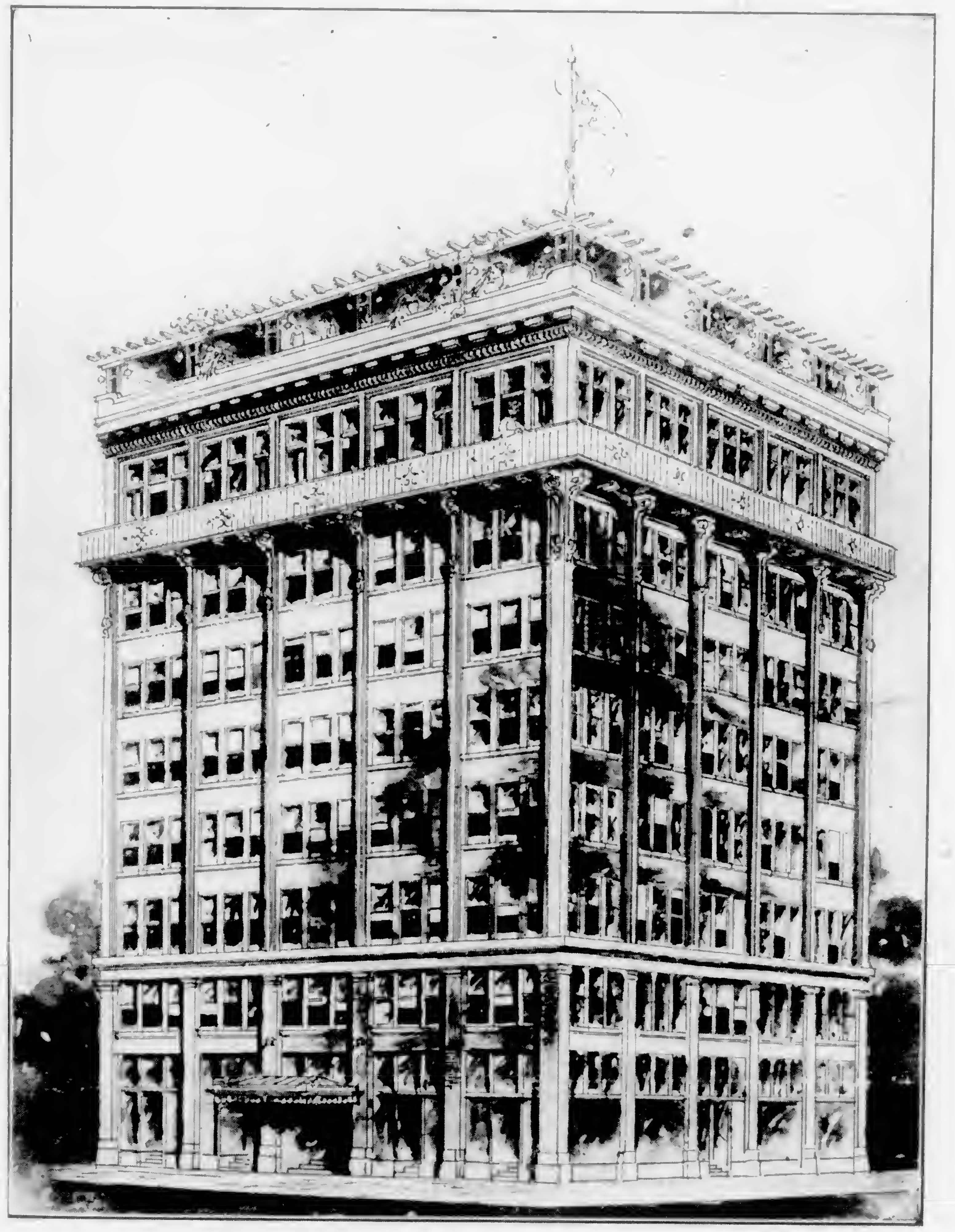


Commercial Club Building, Portland, Ore.

Equipped with Otis Elevators

Whidden & Lewis, Architects

Hotel Portland, Portland, Ore.



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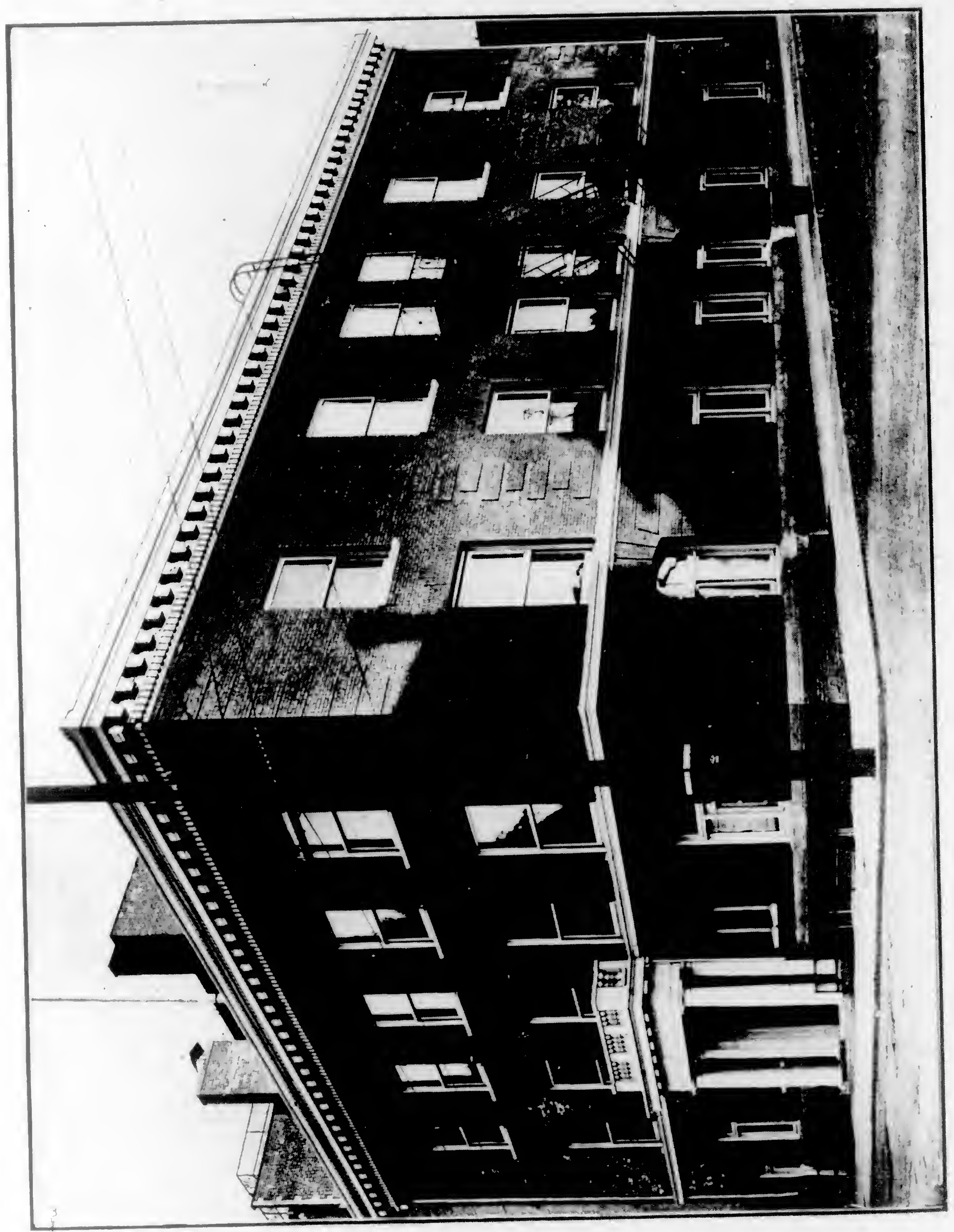
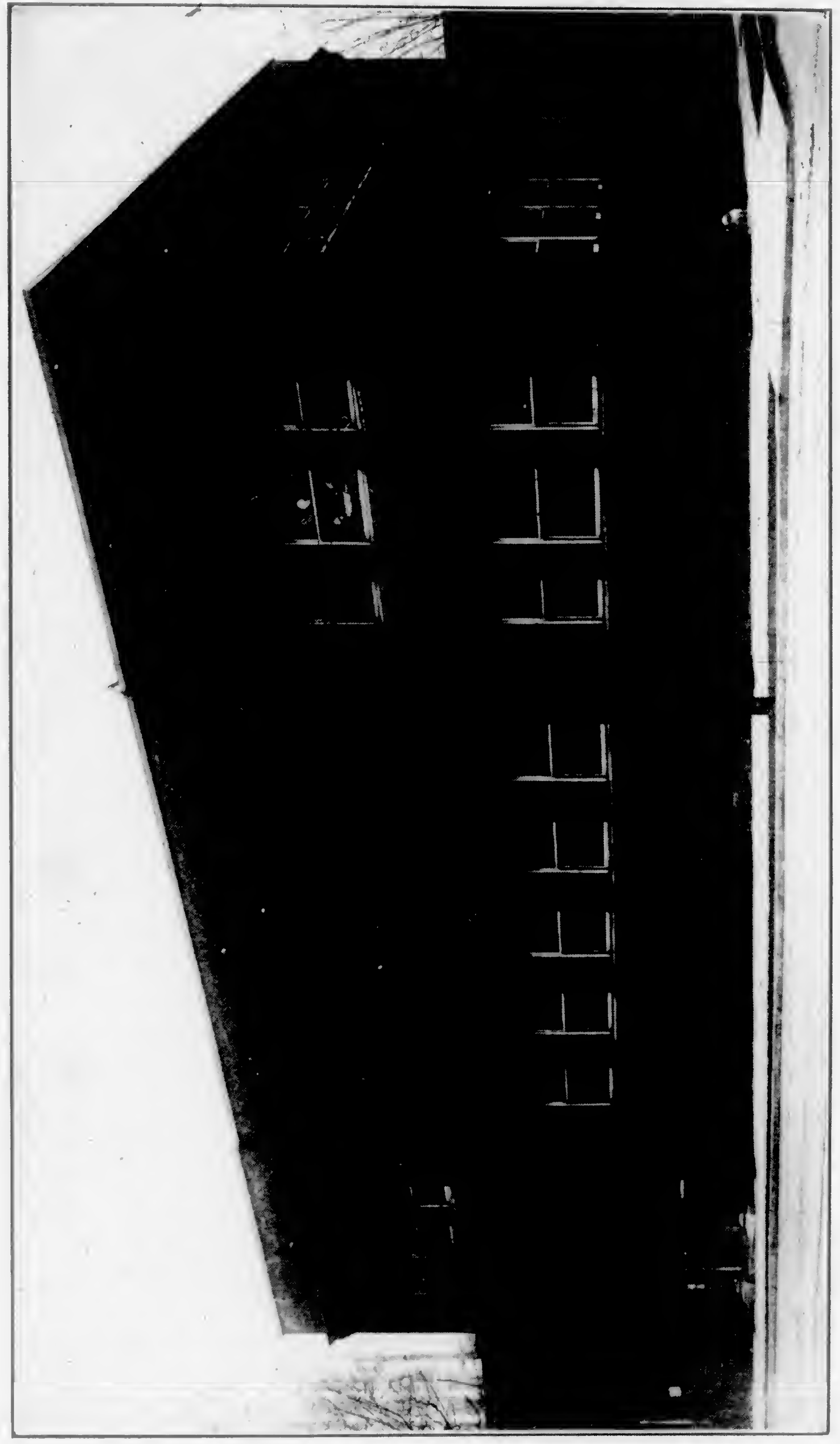
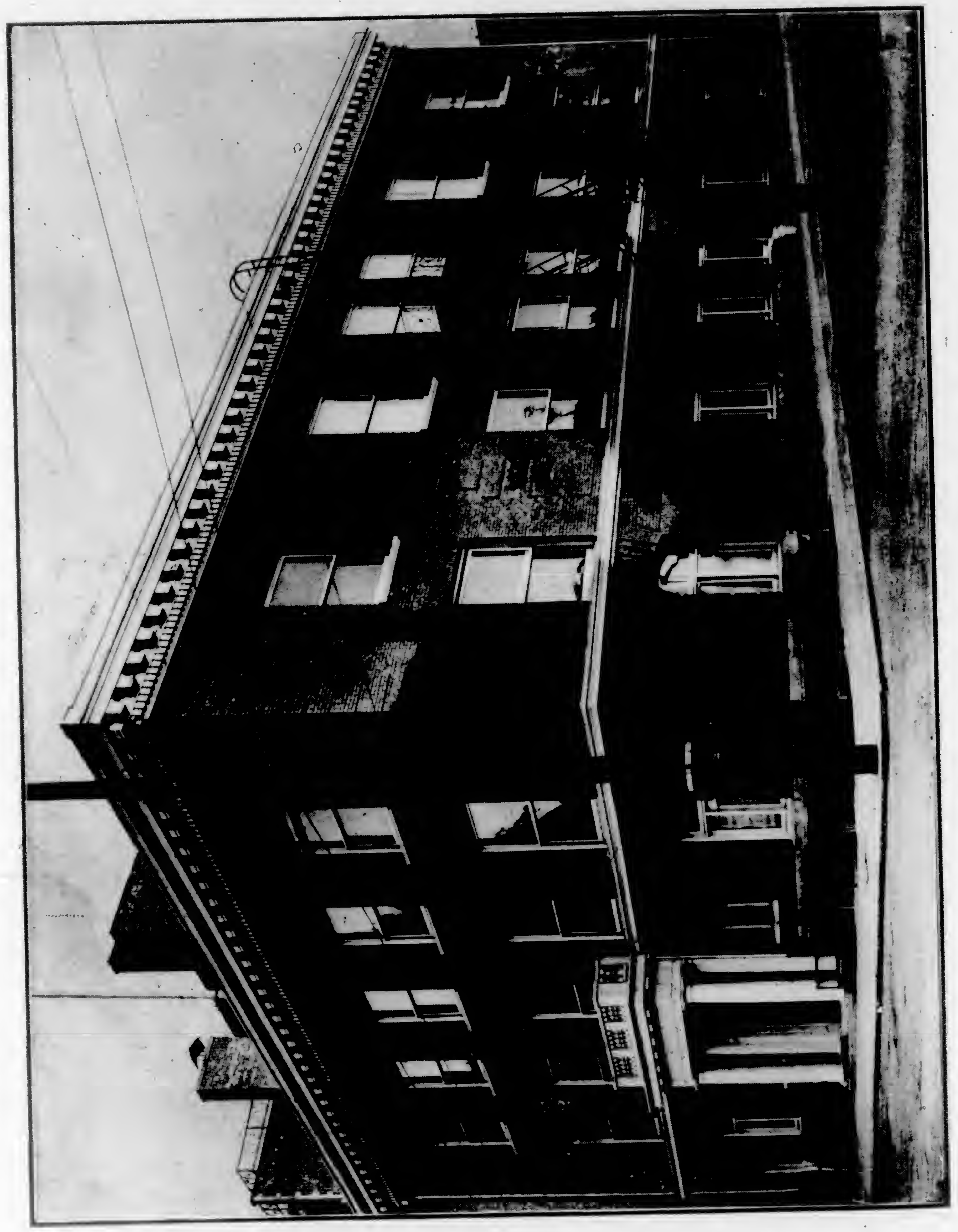


Concordia Club Building Portland Ore Whidden & Lewis Architects

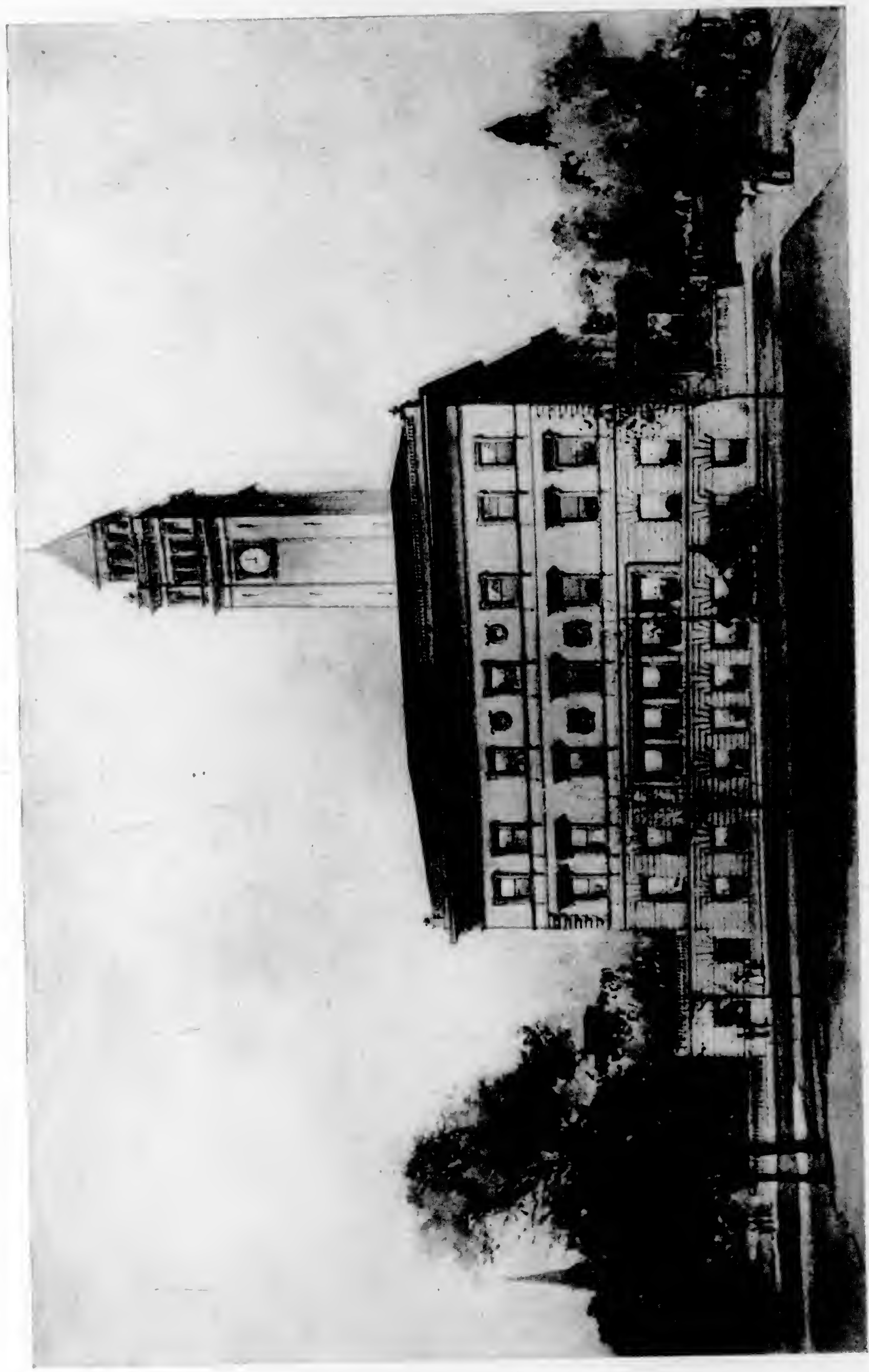


Museum of Art, Portland, Ore.
Whidden & Lewis, Architects

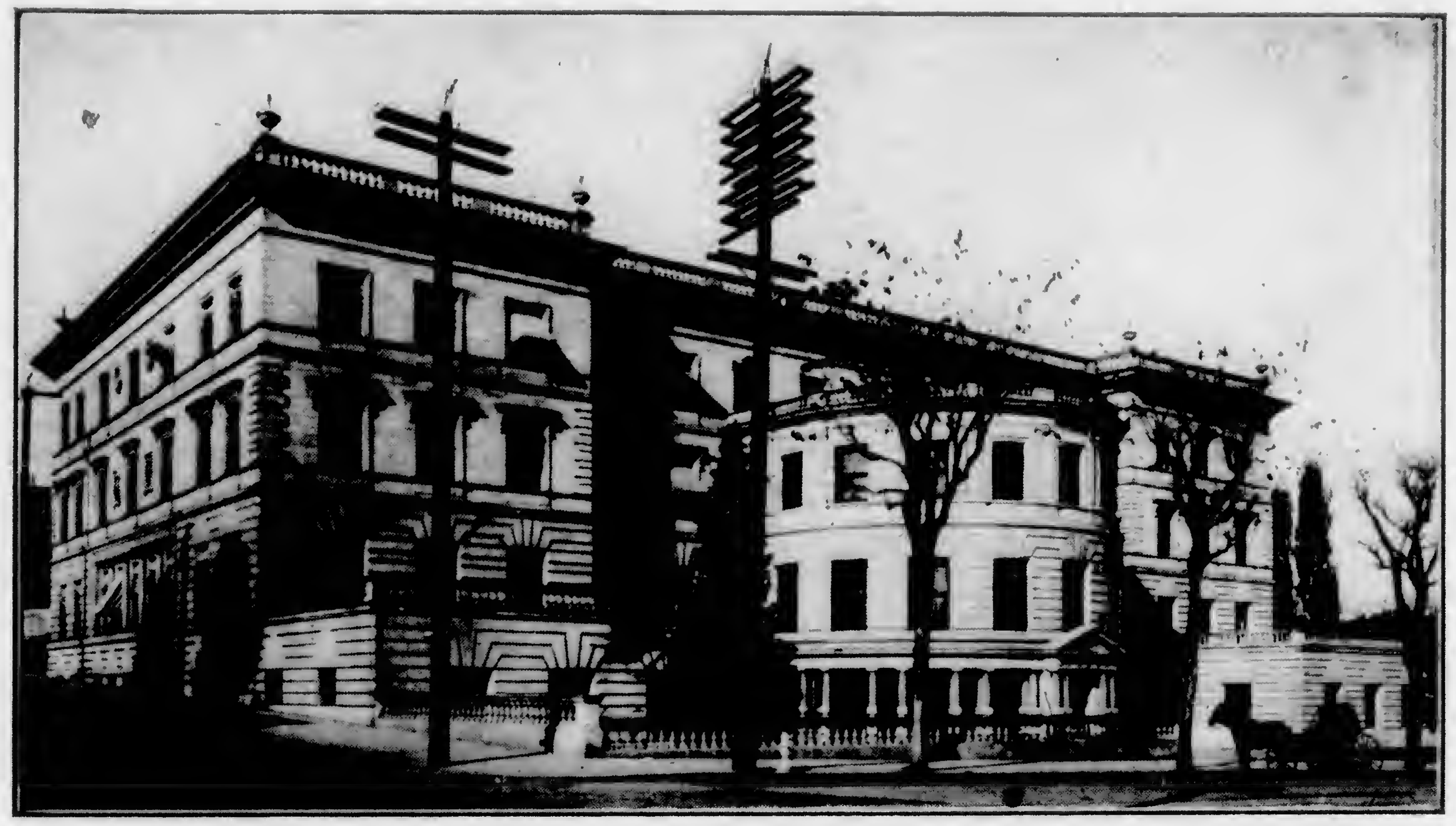


Concordia Club Building, Portland, Ore. Whidden & Lewis, Architects

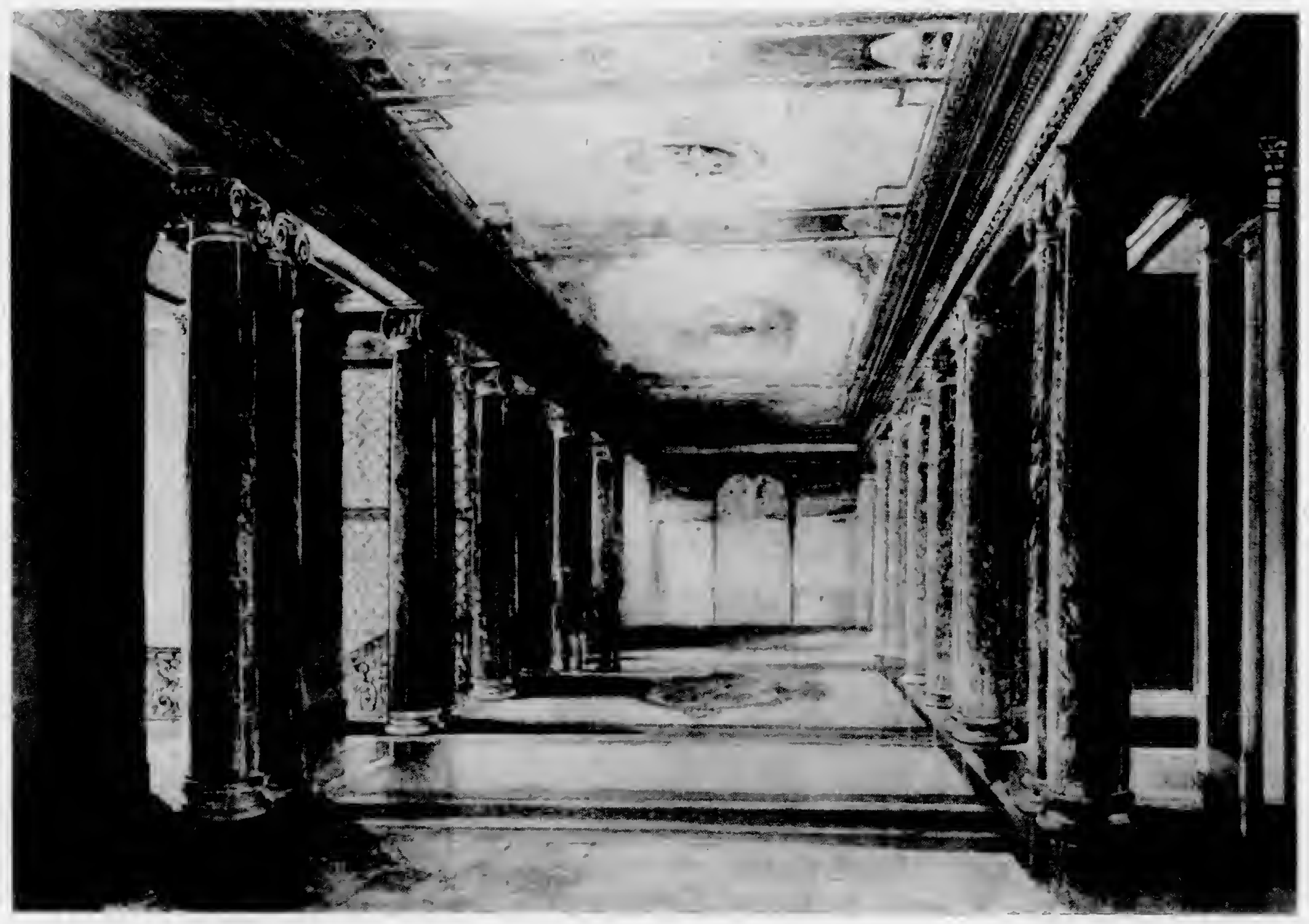
Museum of Art, Portland, Ore.
Whidden & Lewis, Architects



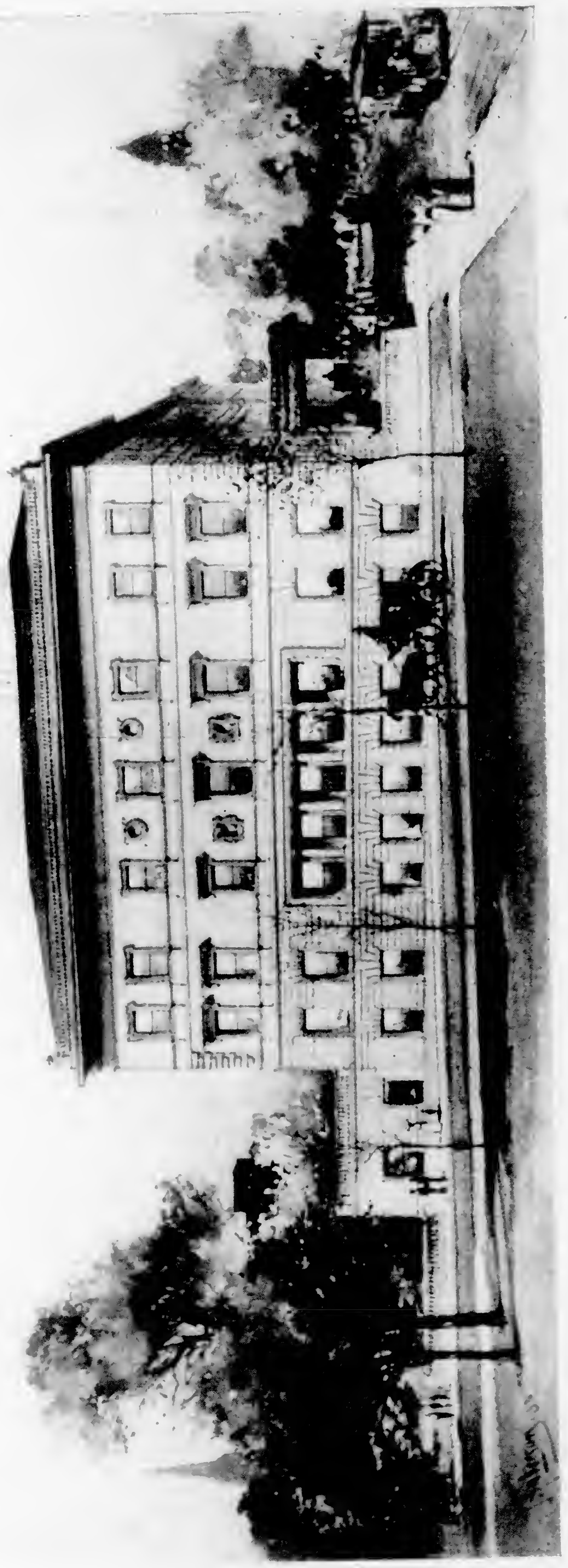
Portland City Hall, Portland, Ore. Whidden & Lewis, Architects



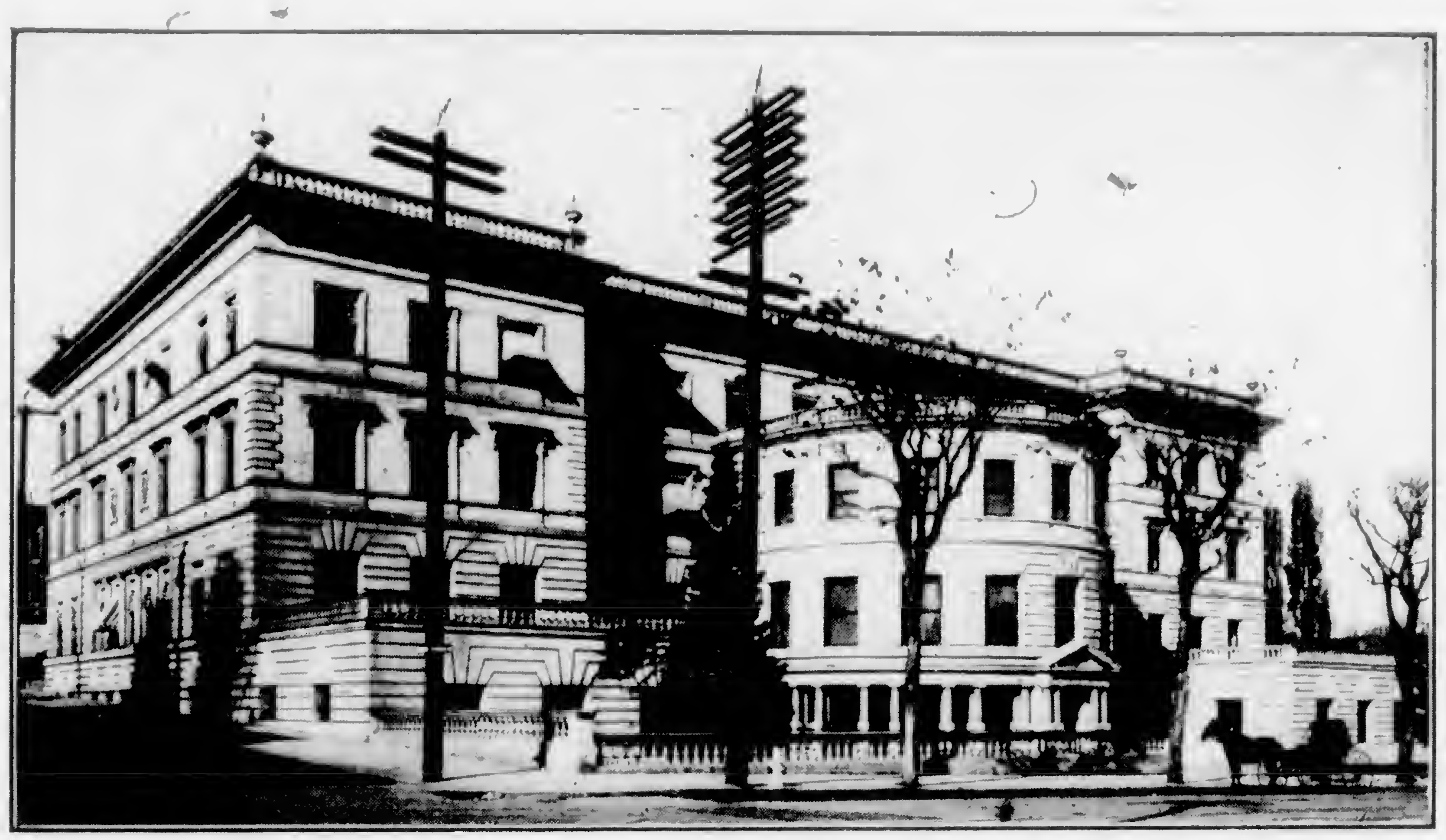
Another View of the Portland City Hall
Whidden & Lewis, Architects



Interior Portland City Hall
Whidden & Lewis, Architects



Portland City Hall, Portland, Ore. Whidden & Lewis, Architects



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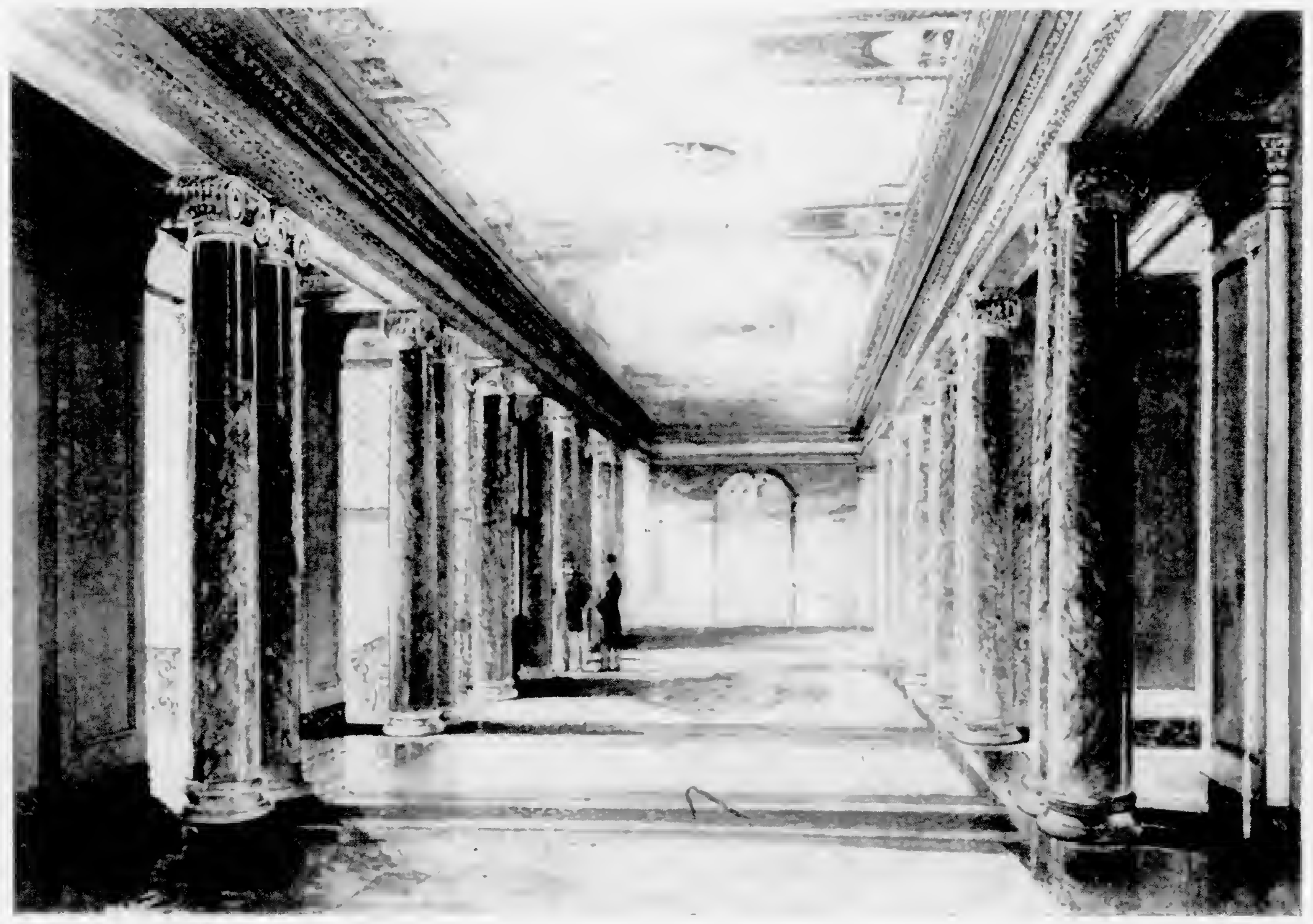


Interior Portland City Hall
Whidden & Lewis, Architects

Council Chamber, Portland City Hall
Whidden & Lewis, Architects

was his conception. This unique structure is distinctly Northwestern in the materials of which it is constructed. It is of itself an exhibit of the forest wealth of the Pacific Northwest, showing the greatness of this section's timber resources. The City of Portland still counts this building as one of its permanent attractions and it is preserved in its original location.

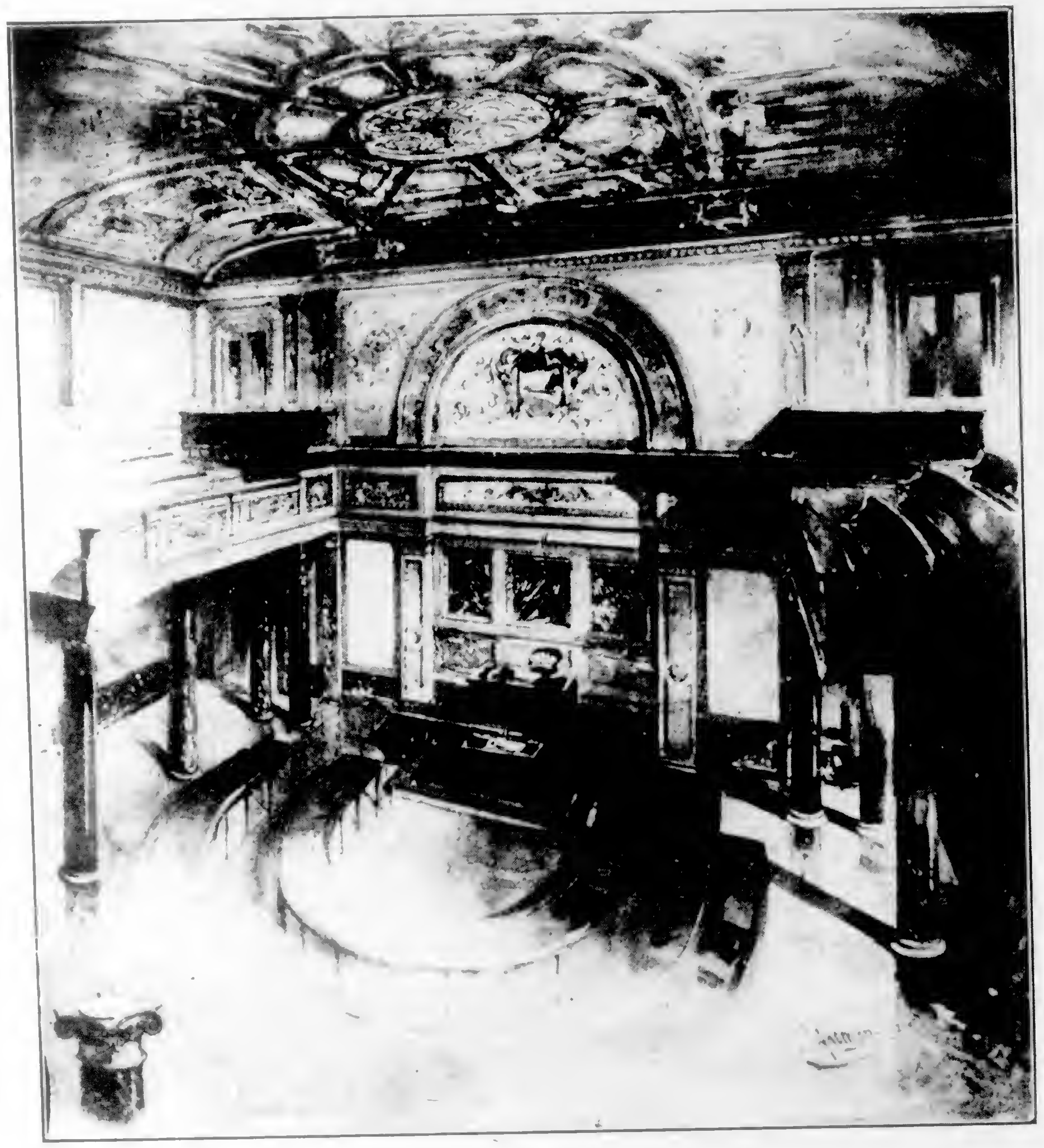
To enumerate Whidden and Lewis' work would be to almost give a list of the public and many of the more notable business buildings of the Rose City. The City Hall, the Art Museum, and the Public Library were designed and erected by them, as were also a long line of office buildings, including the Mohawk, Concord, Failing, Neustadter, Rothschild, Baldwin, Weinhard, Mason-Ehrman, Meier & Frank, Commercial Club, and the Corbett Buildings. The Good Samaritan Hospital was of their construction and they are now working on the plans of the new Homeopathic Hospital, which is to cost something like $250,000.

Their dwelling houses are too numerous to be listed here, but reference may be made to the new residences erected for R. Koehler, M. Lang, W. B. Ayer,

Rothschild Building, Portland, Ore.
Whidden & Lewis, Architects

Arlington Club Building, Portland, Ore.

Equipped with Otis Elevators *Whidden & Lewis, Architects*



Council Chamber, Portland City Hall
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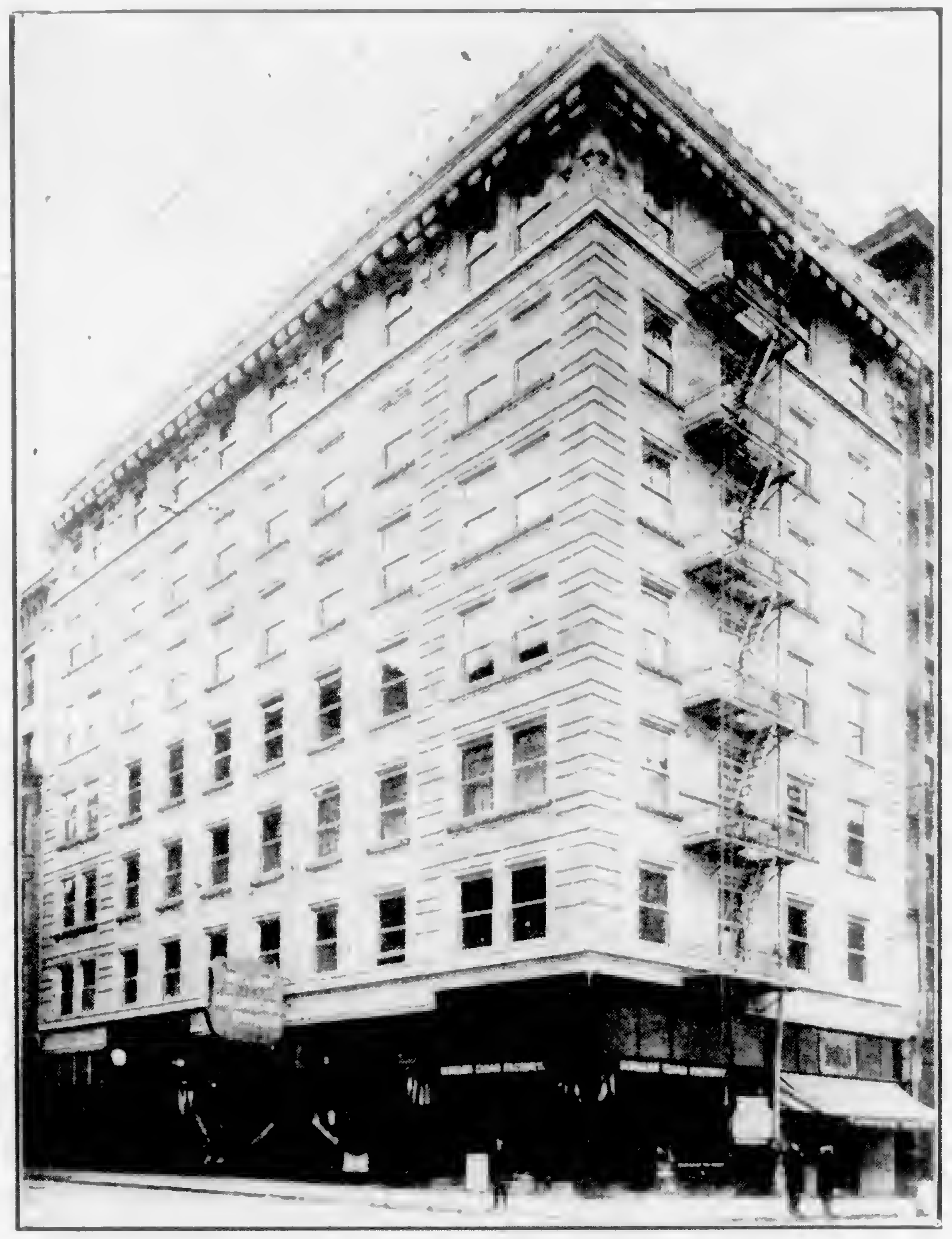
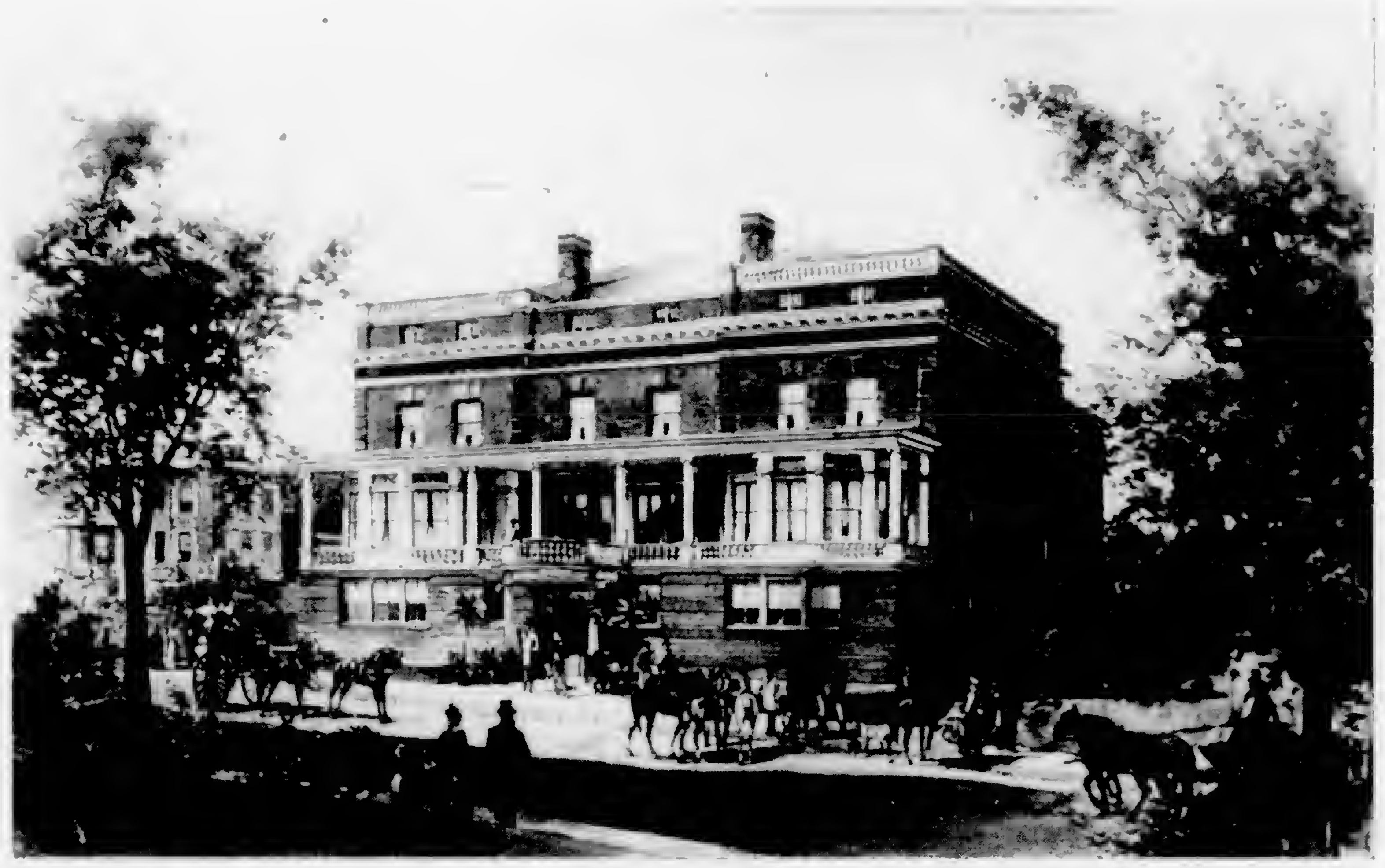
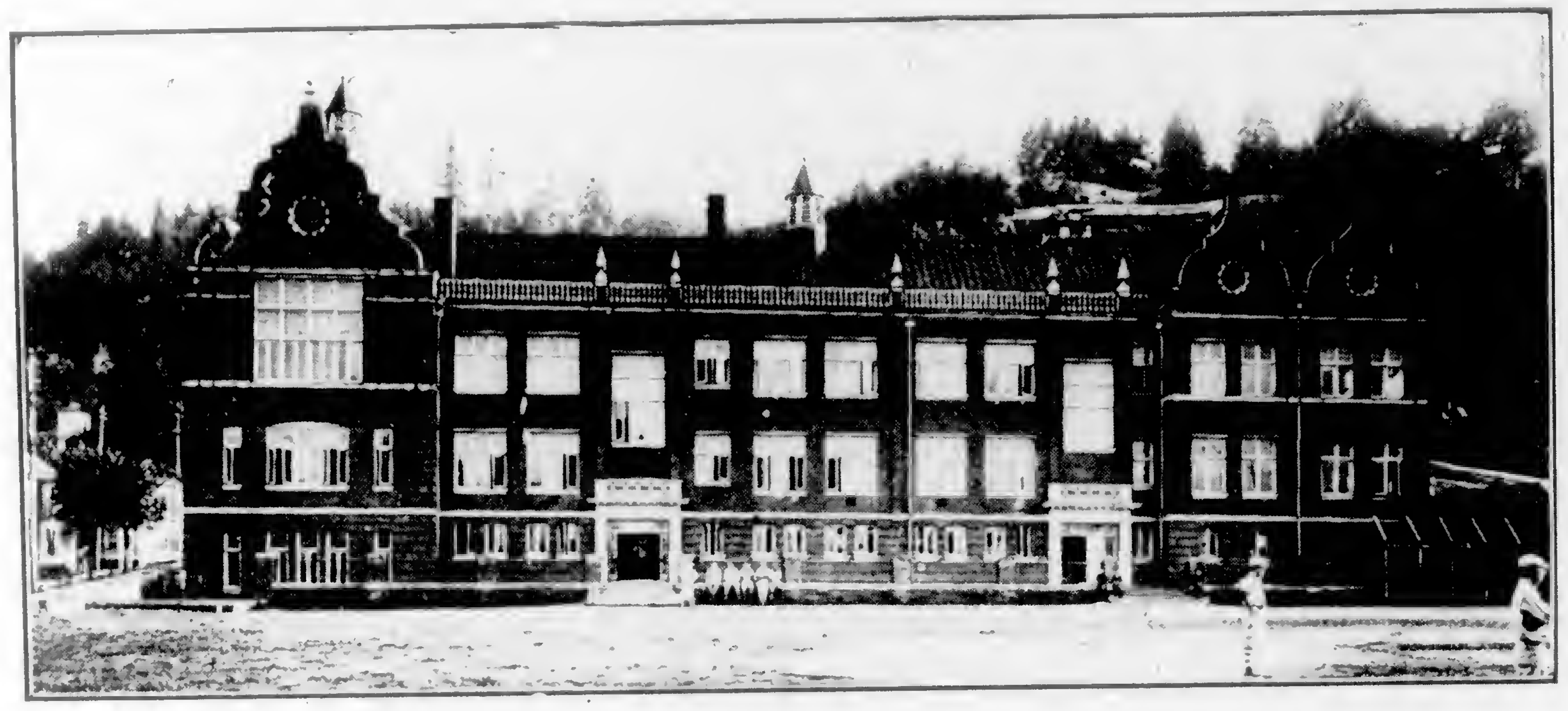


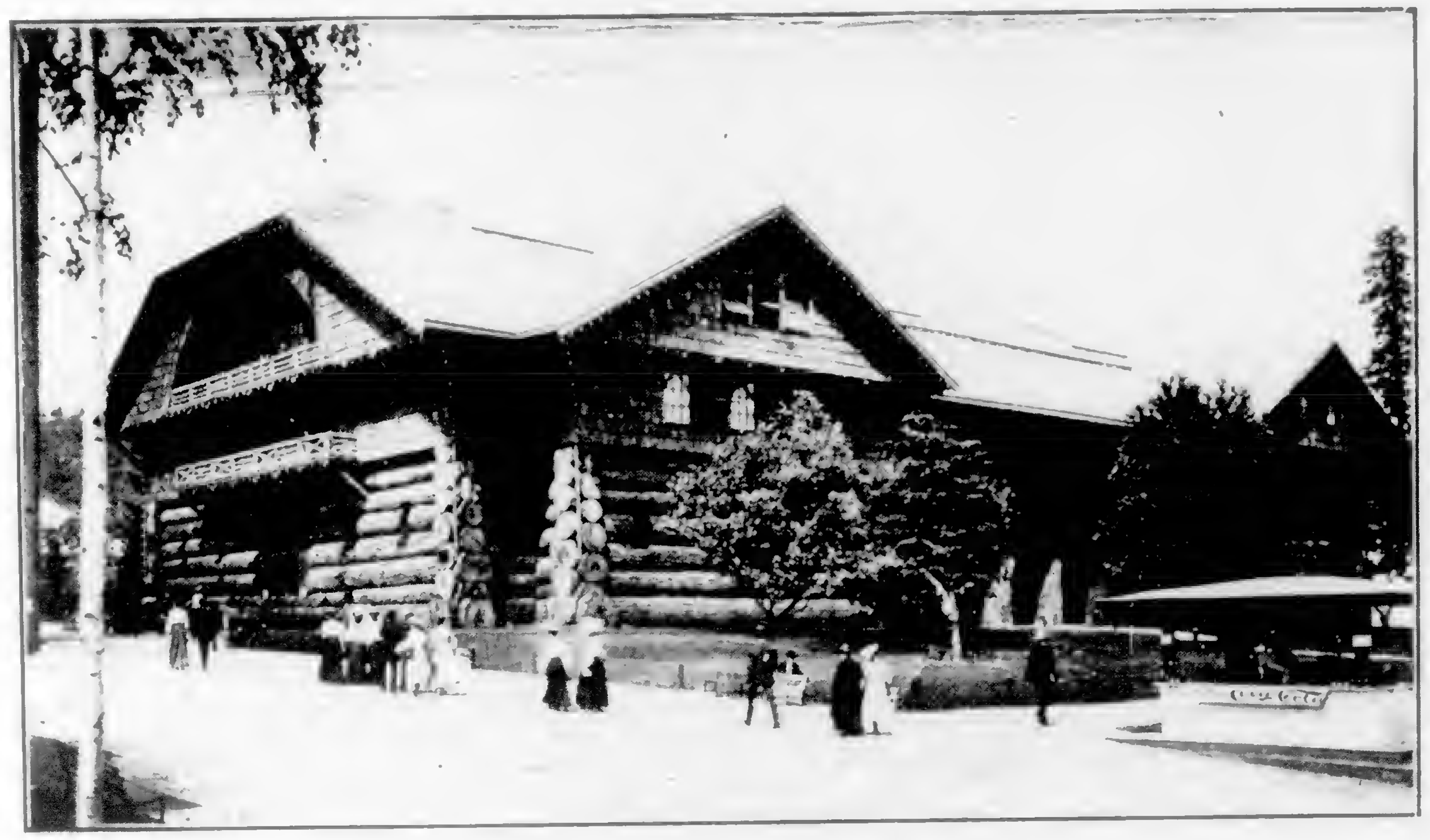
Rothschild Building, Portland, Ore.
Whidden & Lewis, Architects



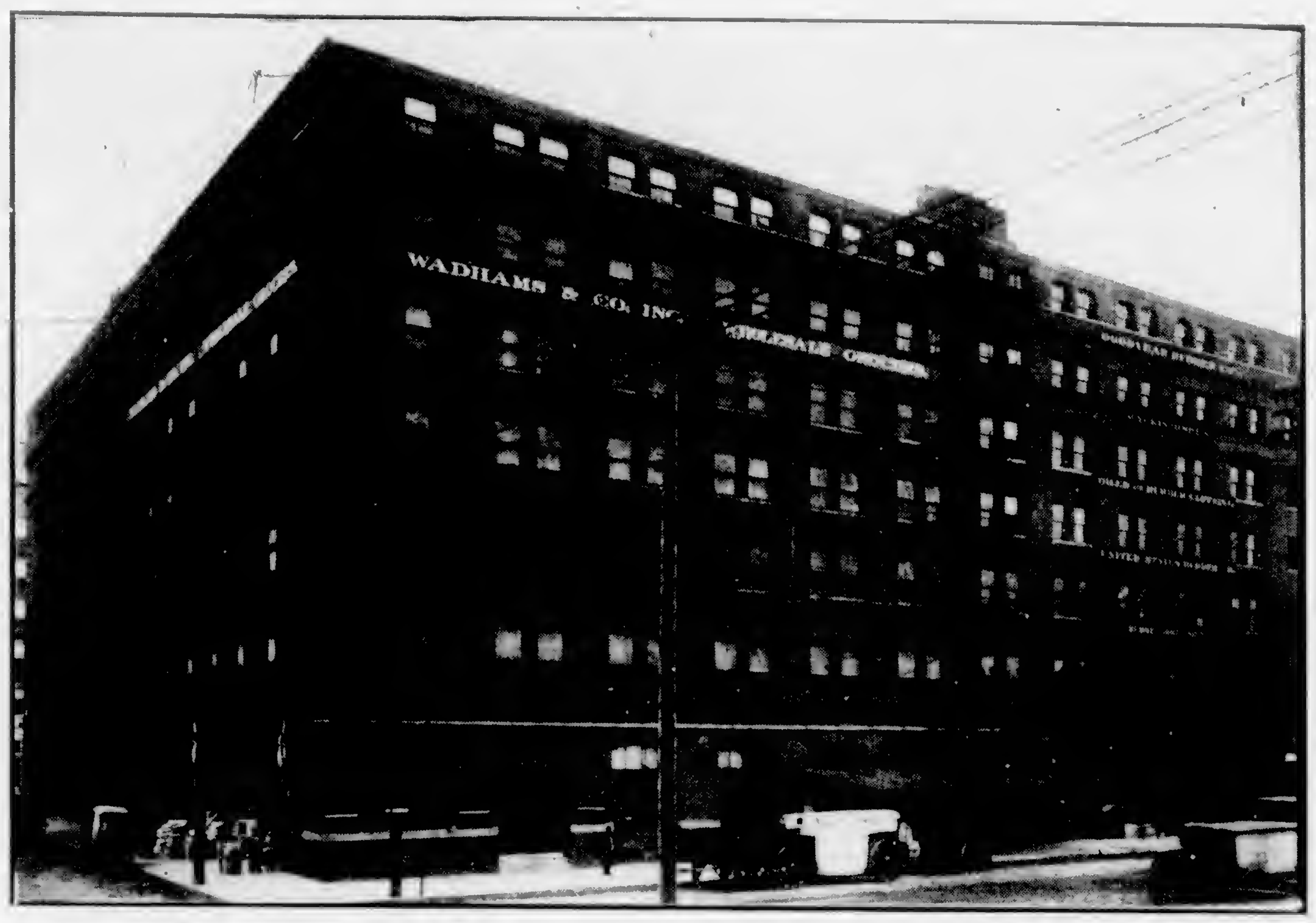
Arlington Club Building, Portland, Ore.
Equipped with Otis Elevators
Whidden & Lewis, Architects



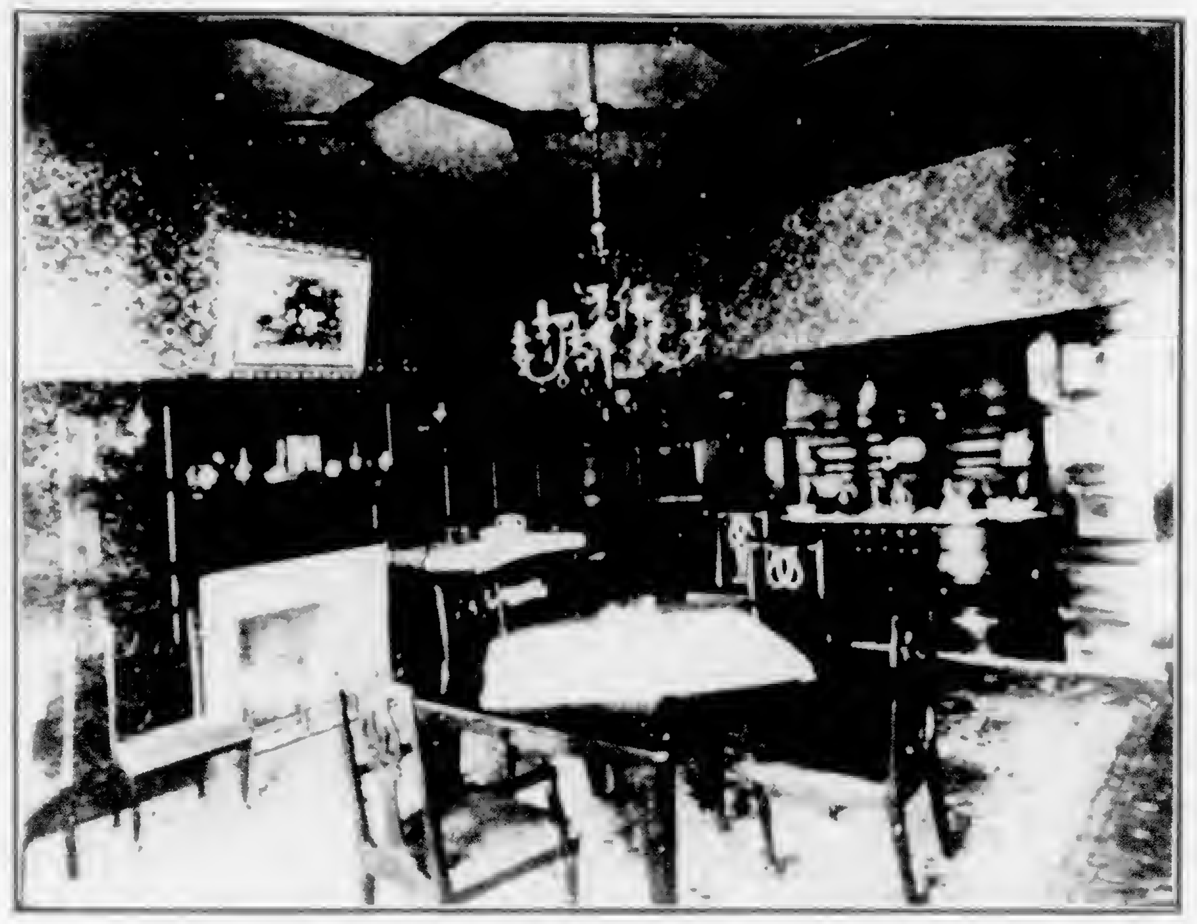
Portland Academy, Portland, Ore.
Whidden & Lewis, Architects



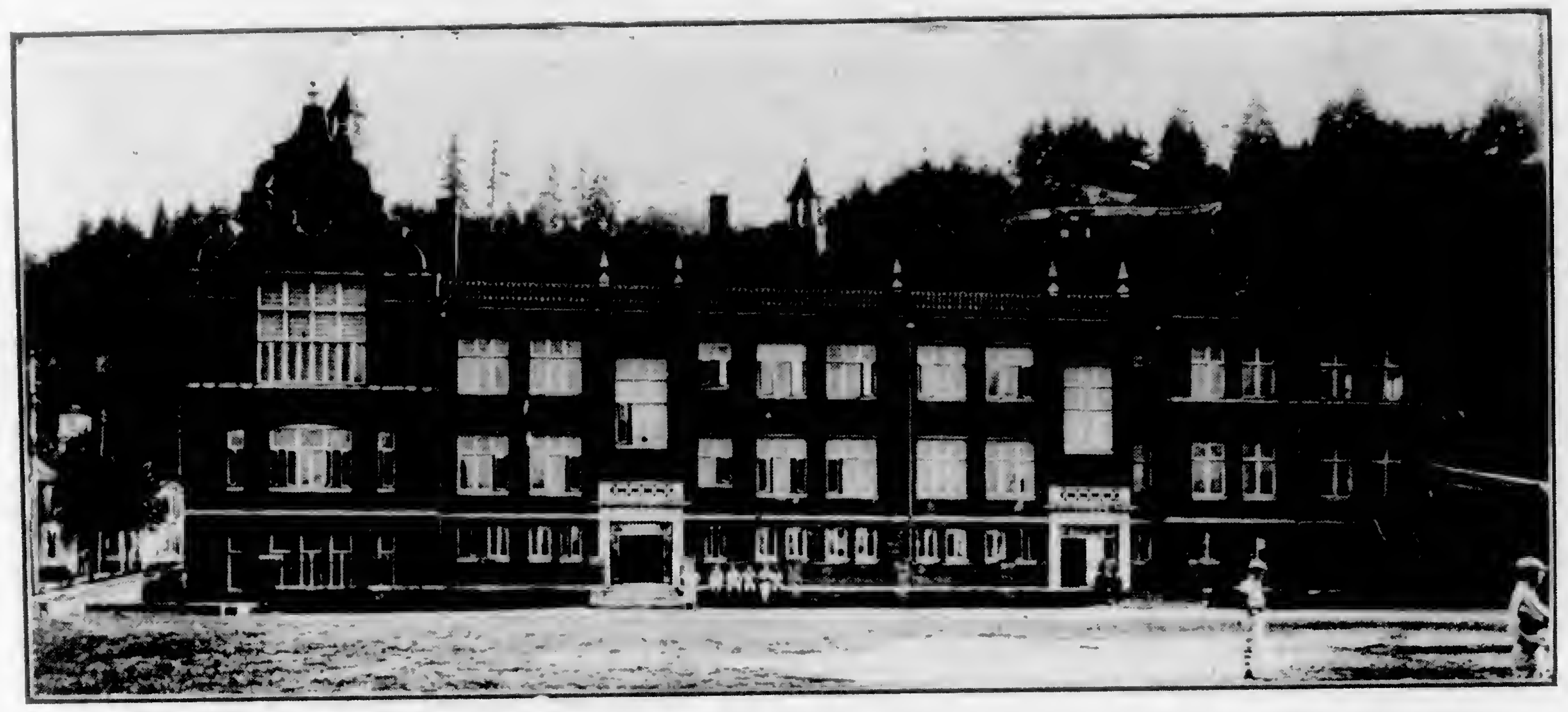
Forestry Building, Portland, Ore.
Whidden & Lewis, Architects



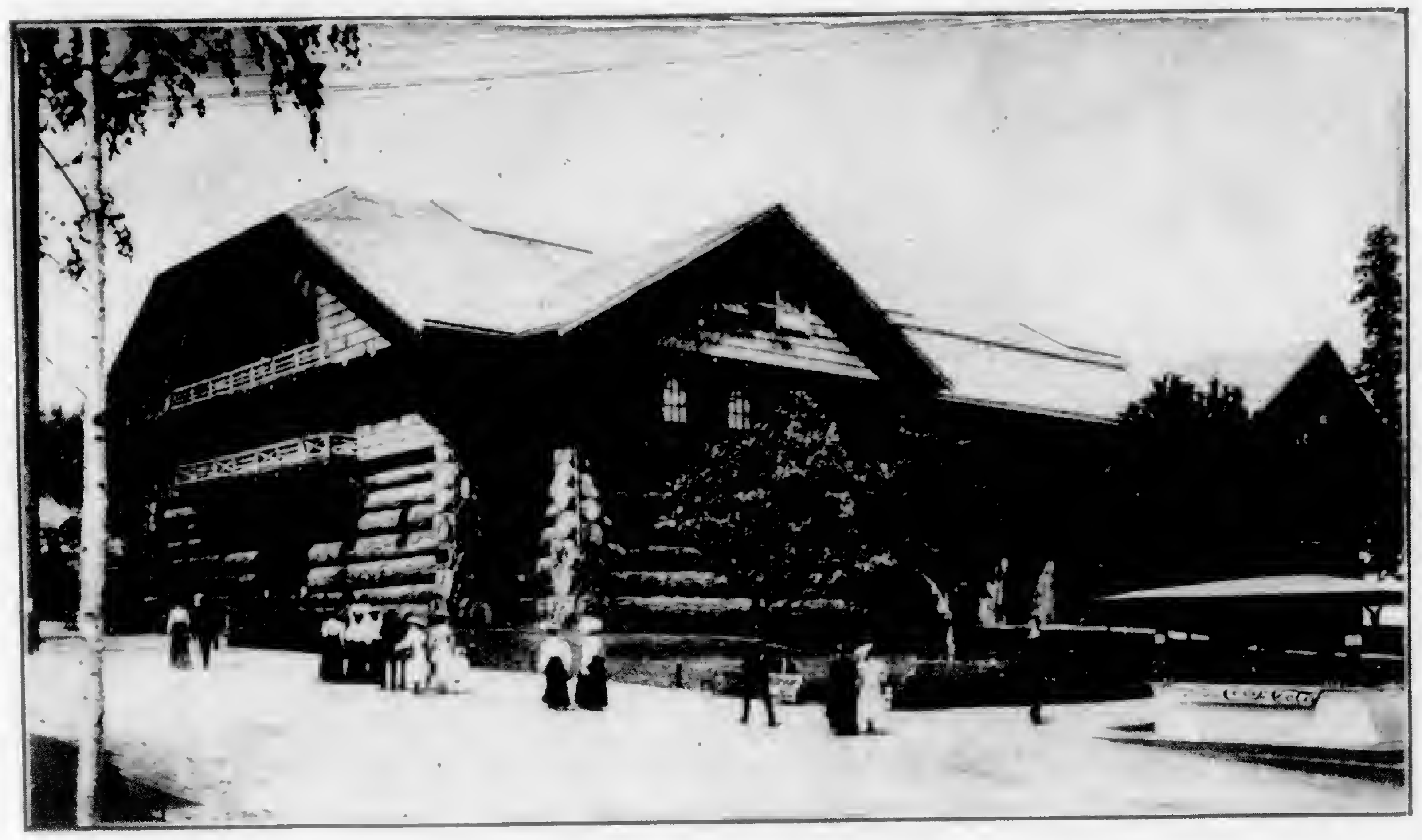
Equipped with Otis Elevators *Weinhart Building, Portland, Ore.* *Whidden & Lewis, Architects*



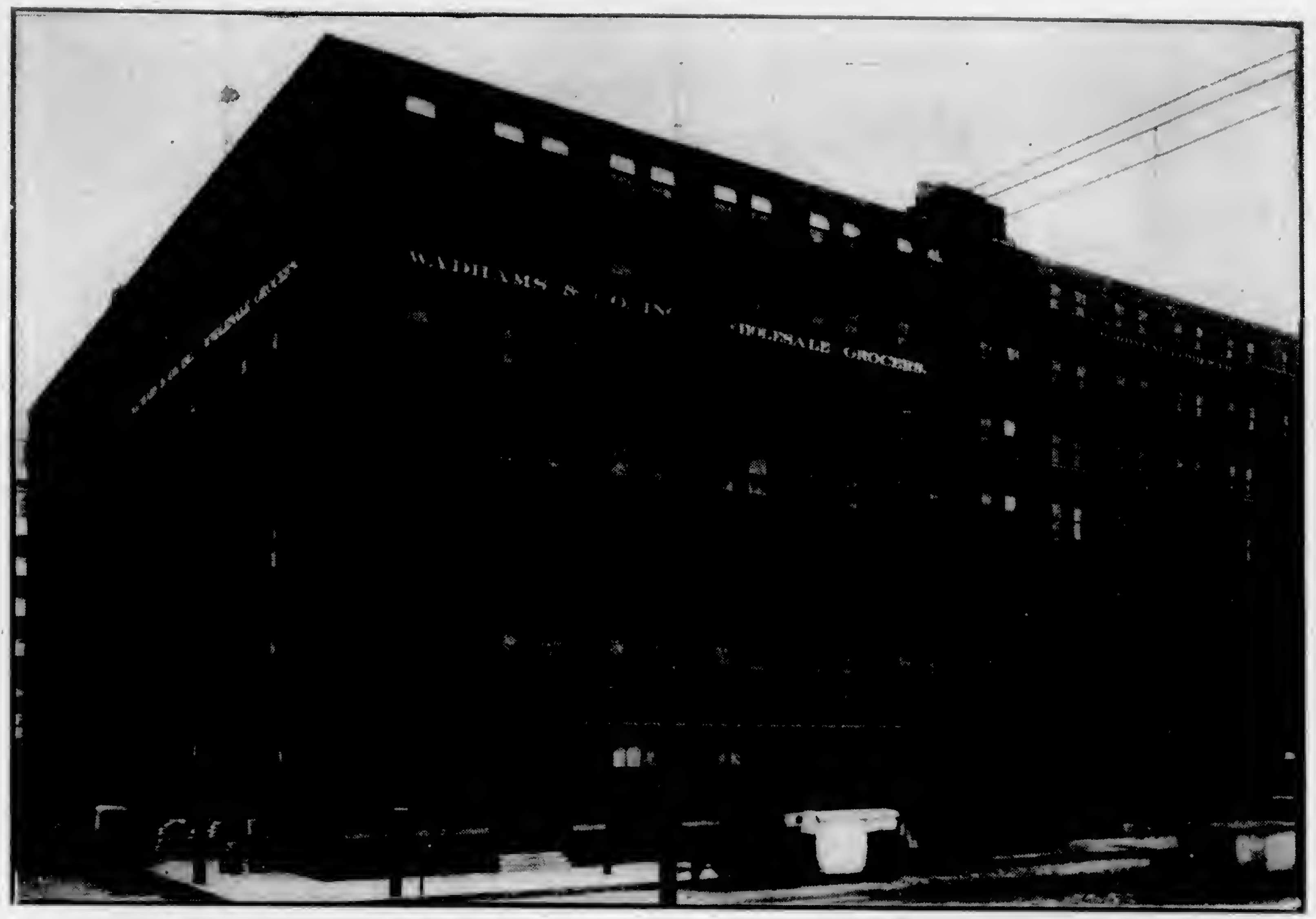
Interior of the Maxwell Residence, Portland, Ore.
Whidden & Lewis, Architects



Portland Academy, Portland, Ore.
Whidden & Lewis, Architects

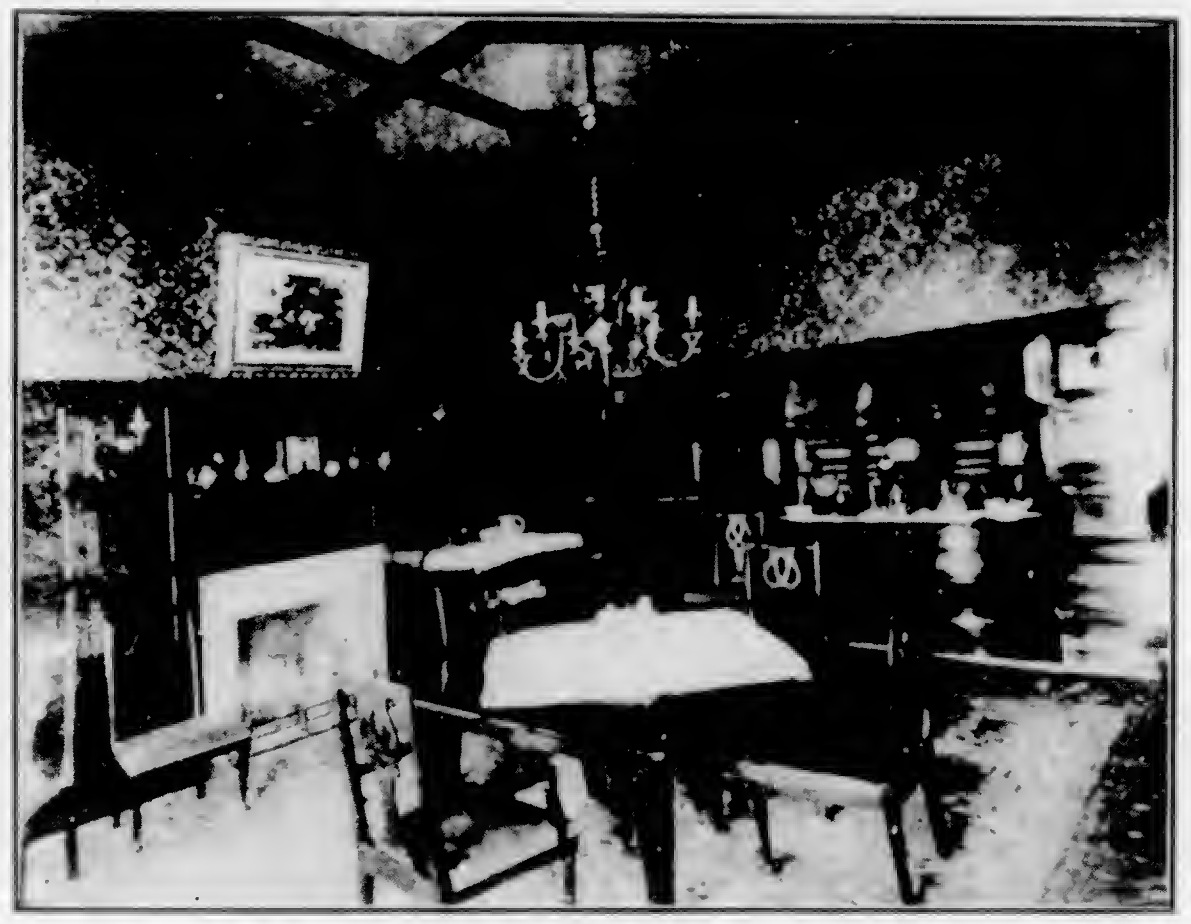


Forestry Building, Portland, Ore.
Whidden & Lewis, Architects



Weinhart Building, Portland, Ore.

Equipped with Otis Elevators *Whidden & Lewis, Architects*



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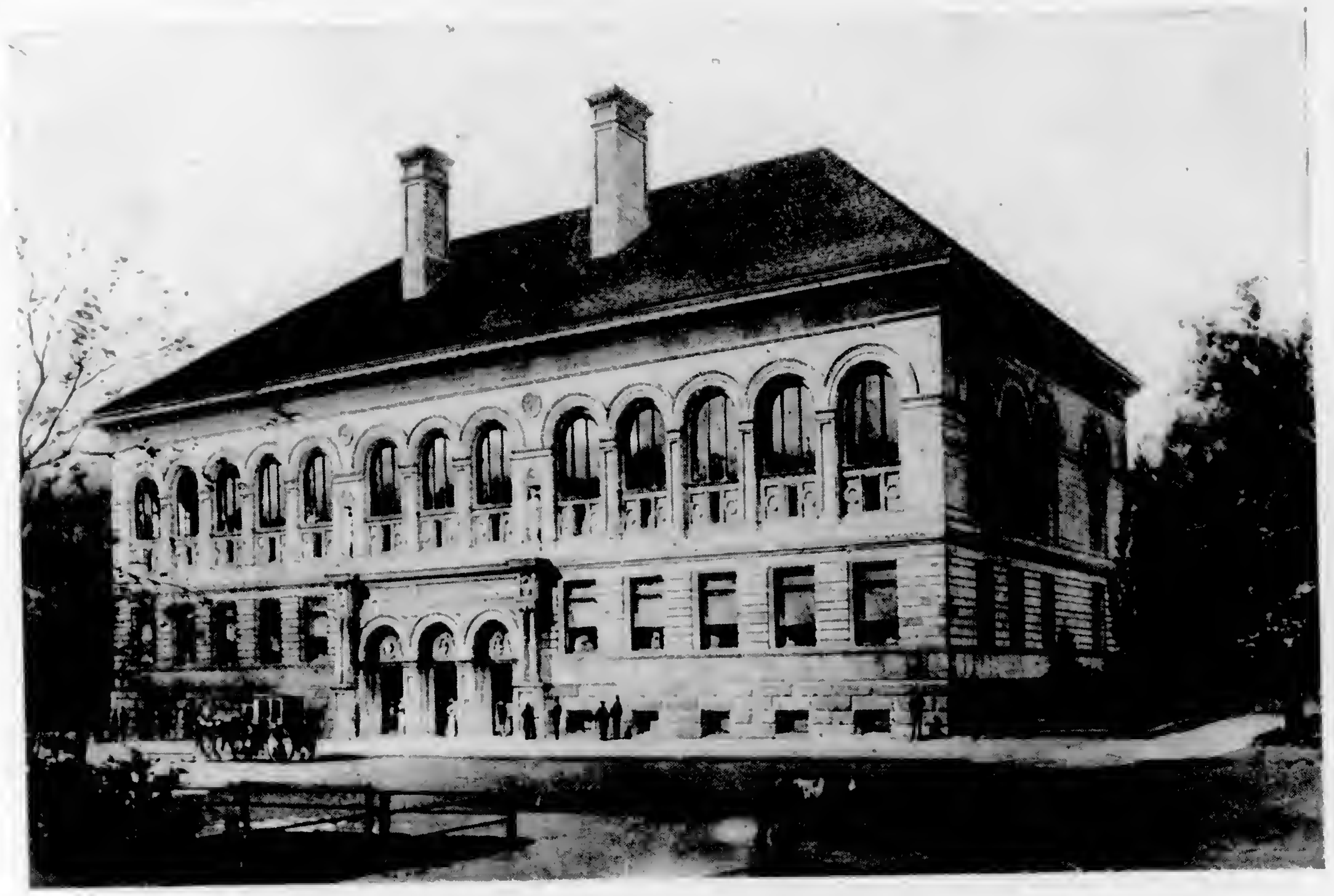
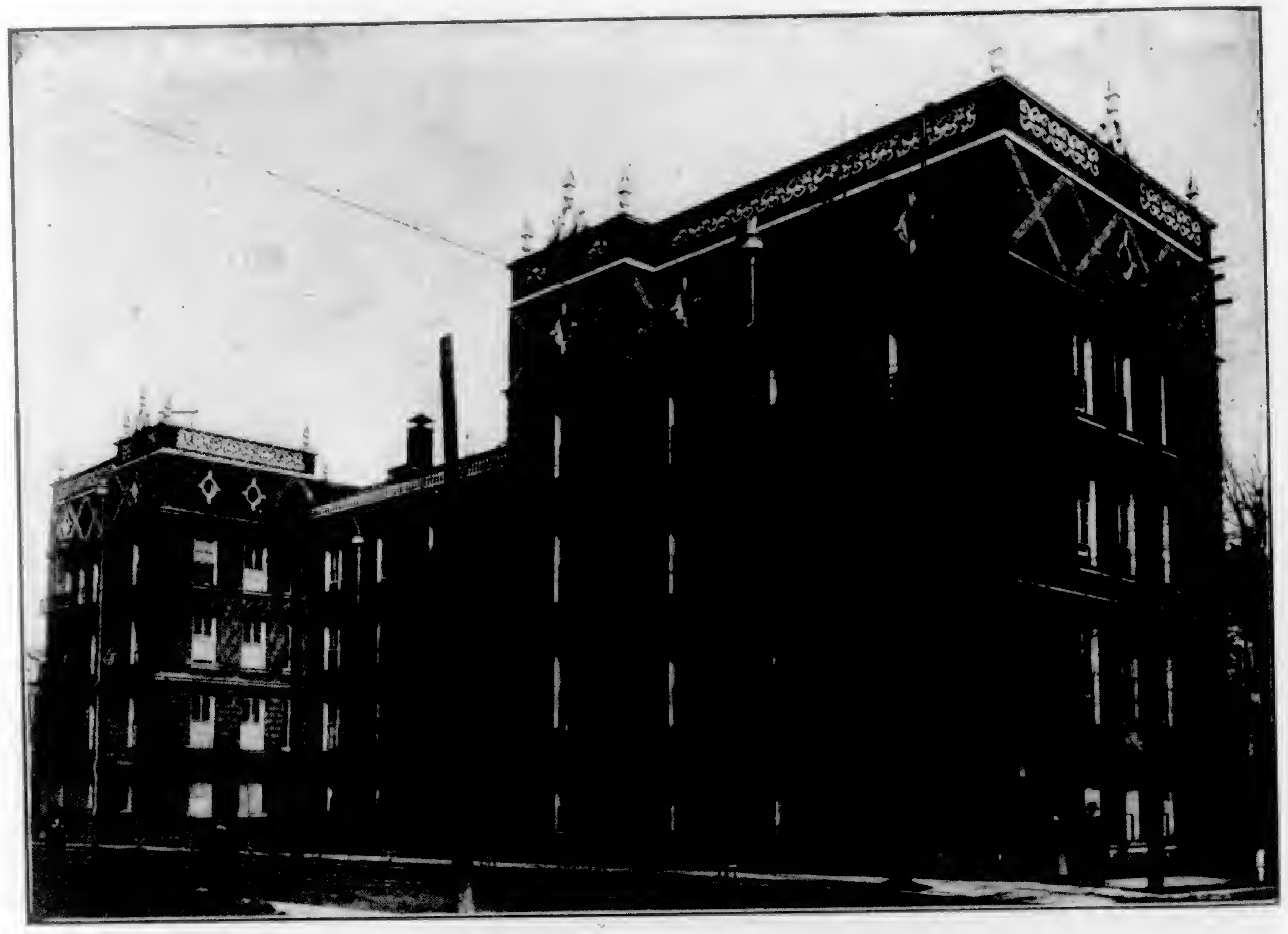


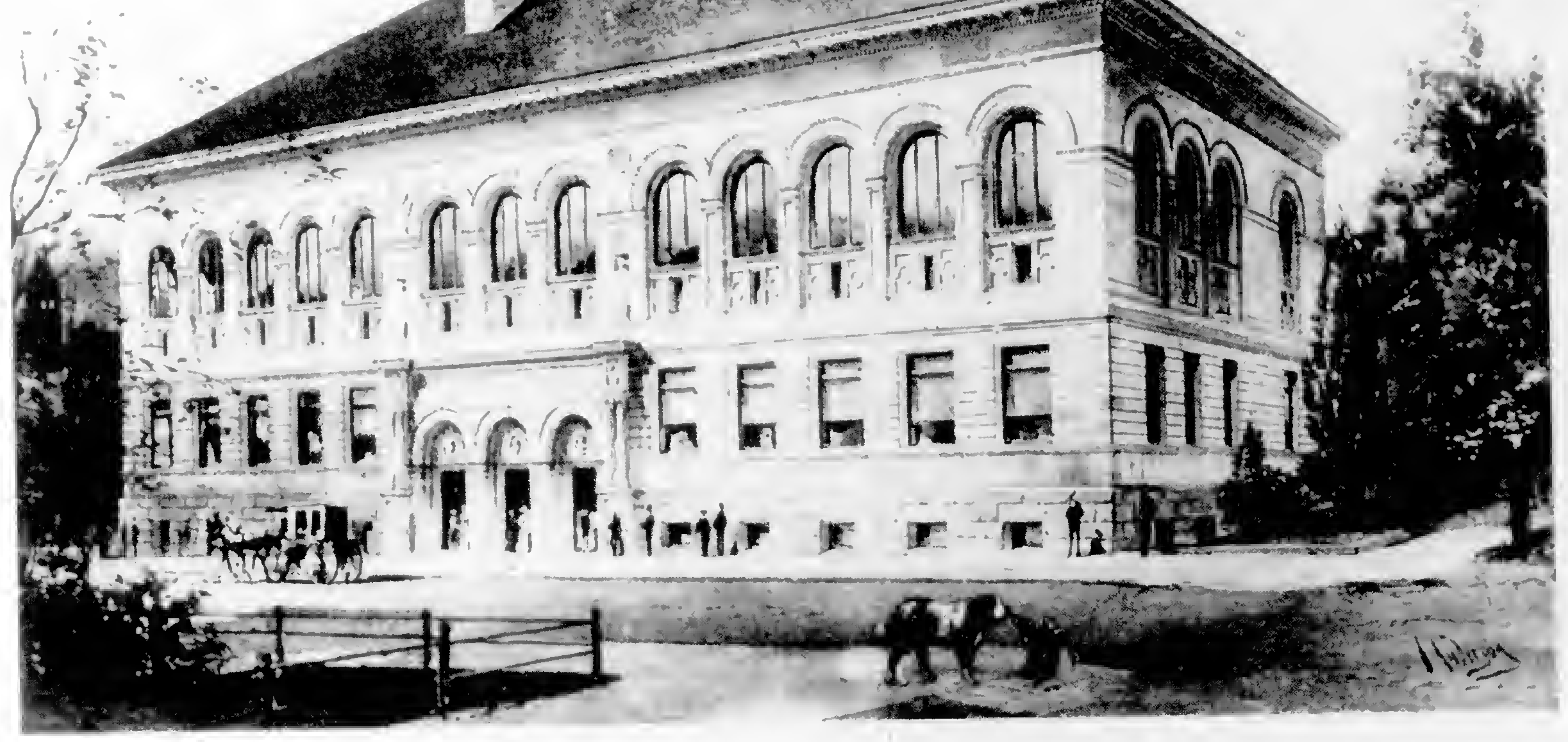
Portland City Library, Portland, Ore.
Whidden & Lewis, Architects



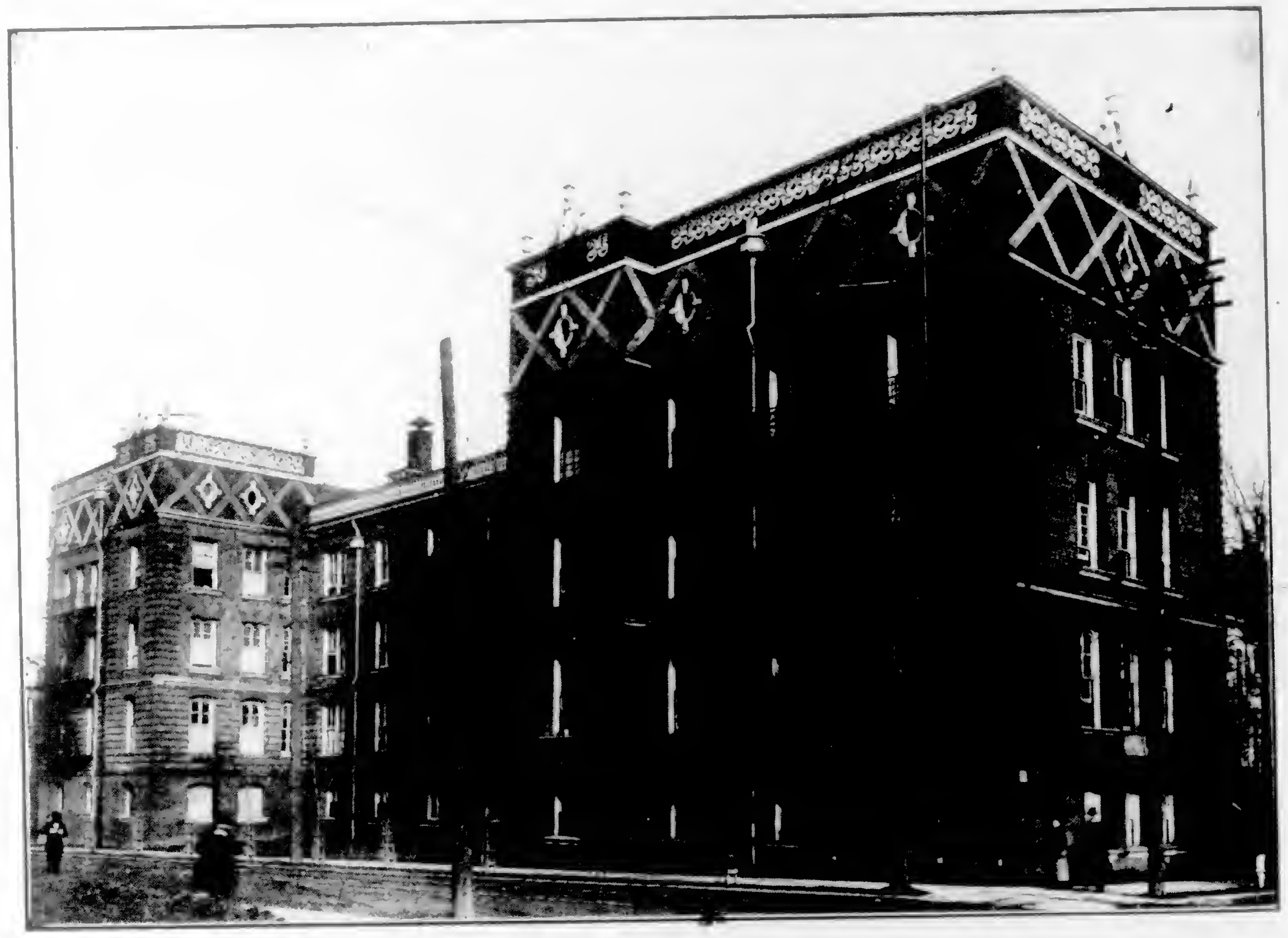
The Good Samaritan Hospital, Portland, Ore.
Equipped with Otis Elevators
Whidden & Lewis, Architects

Honeyman Residence, Portland, Ore. Whidden & Lewis, Architects

The Wolfe Residence, Portland, Ore. Whidden & Lewis, Architects

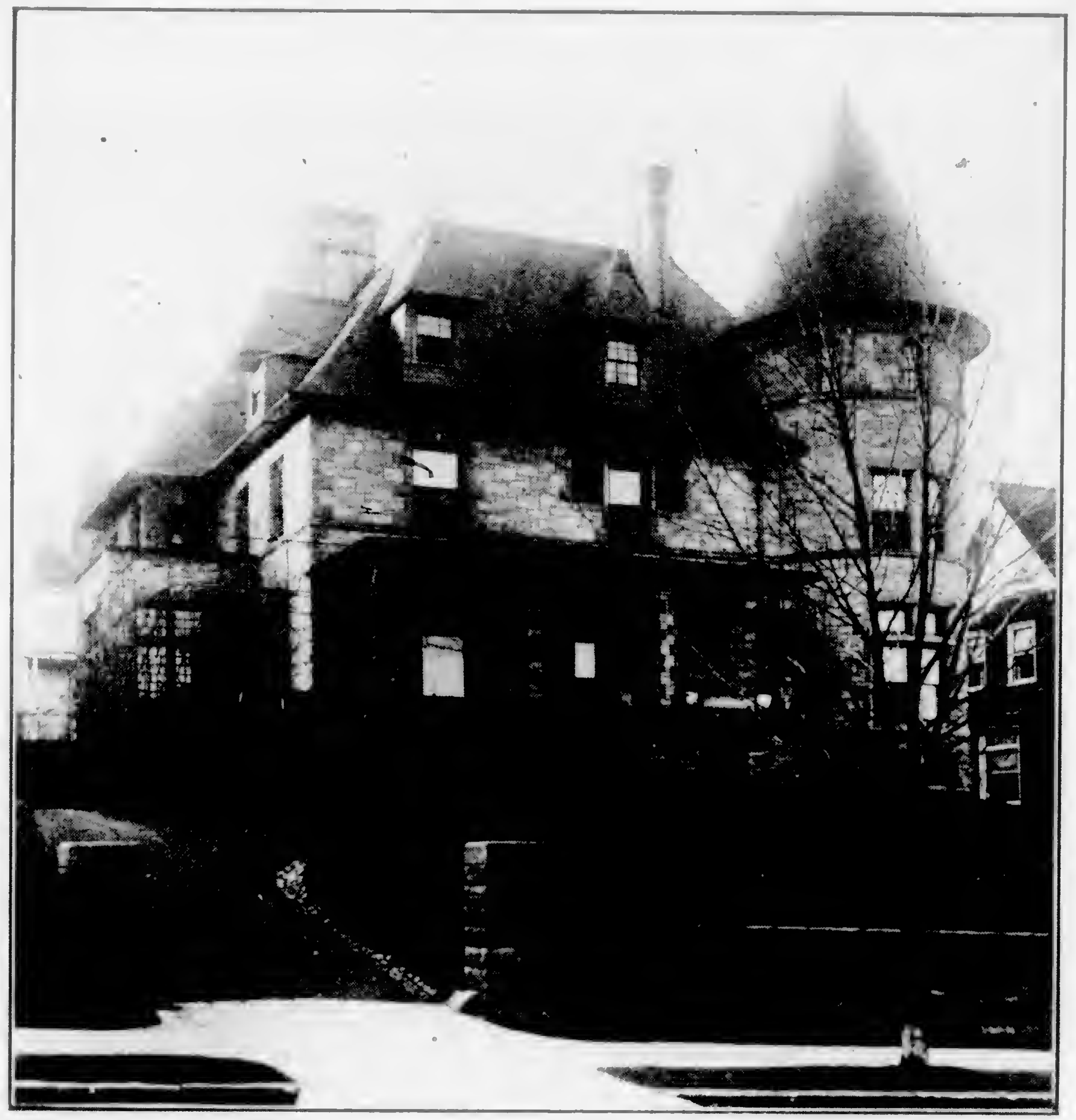


Portland City Library, Portland, Ore.
Whidden & Lewis, Architects

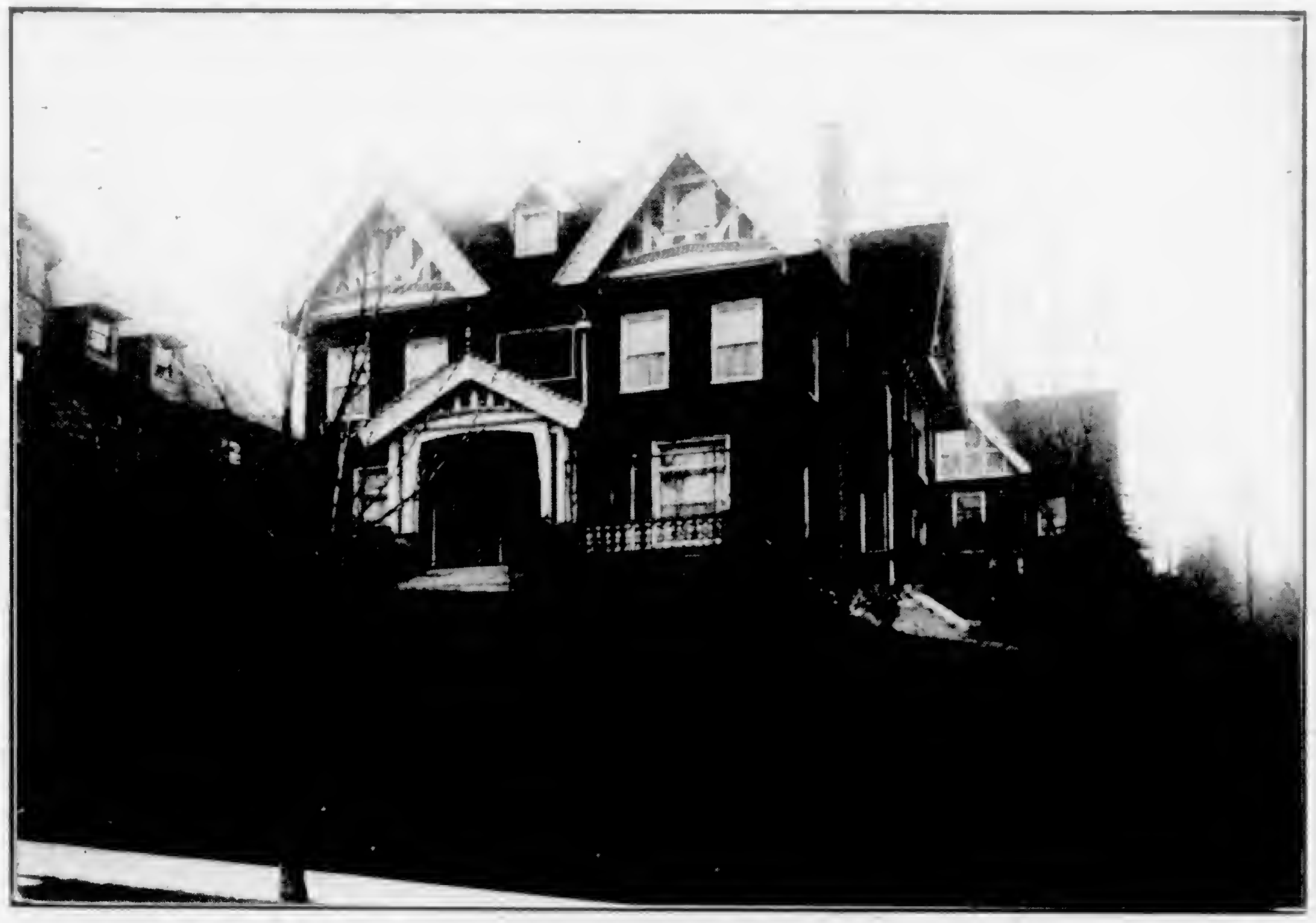


The Good Samaritan Hospital, Portland, Ore.

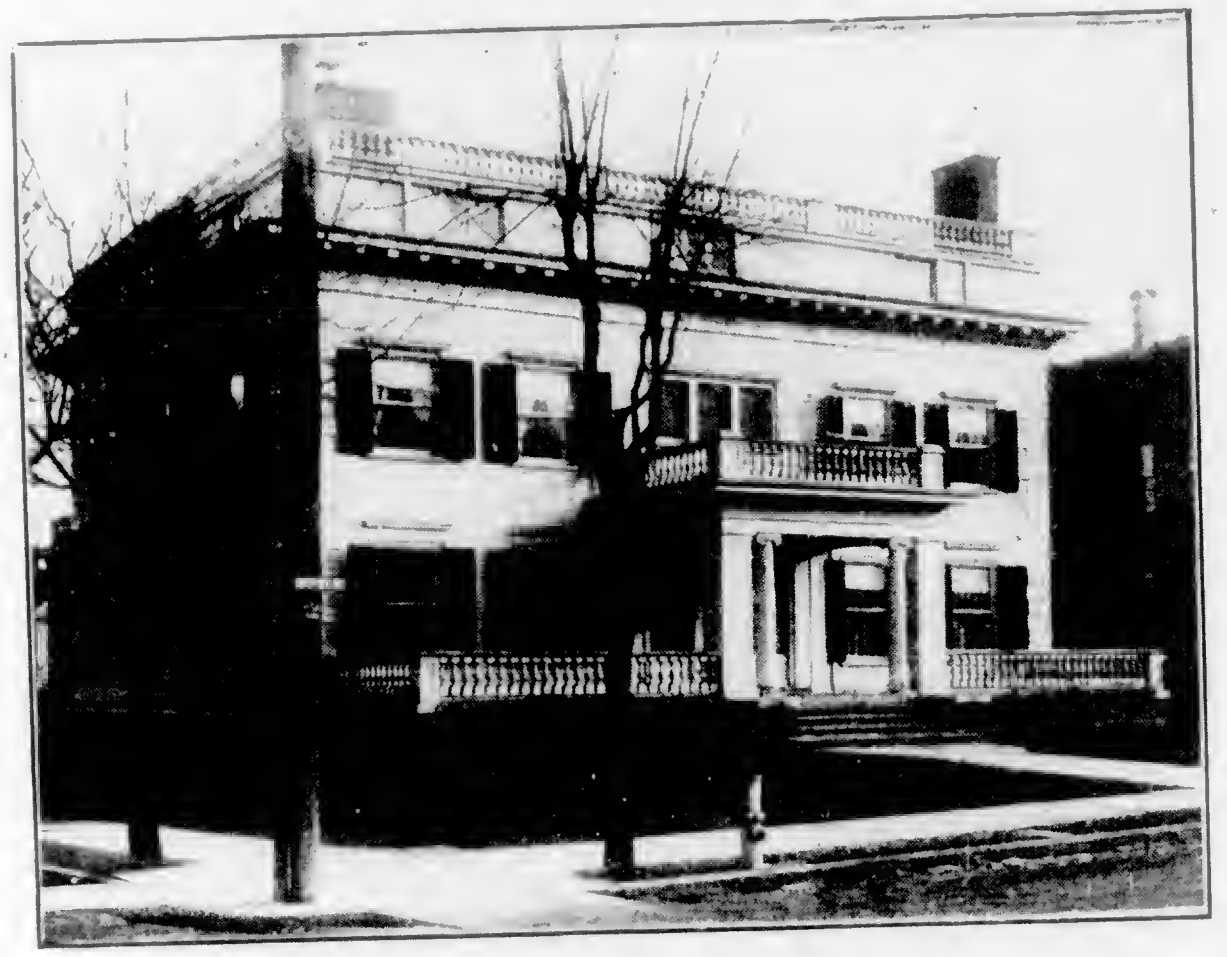
Equipped with Otis Elevators *Whidden & Lewis, Architects*



Honeyman Residence, Portland, Ore. Whidden & Lewis, Architects

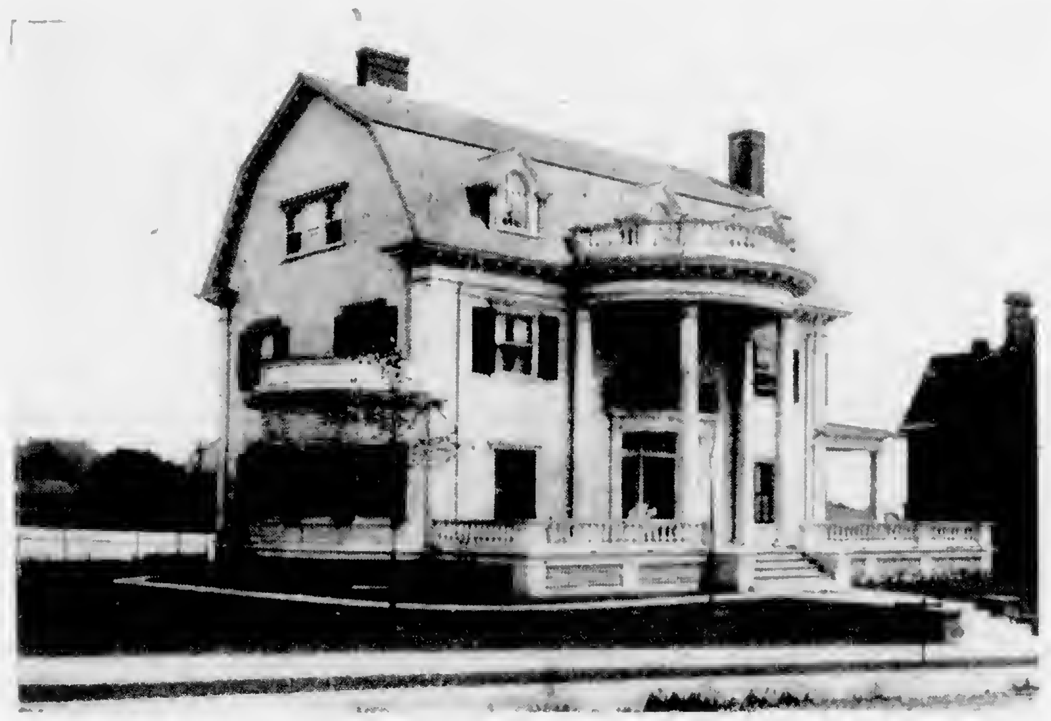


The Wolfe Residence, Portland, Ore. Whidden & Lewis, Architects



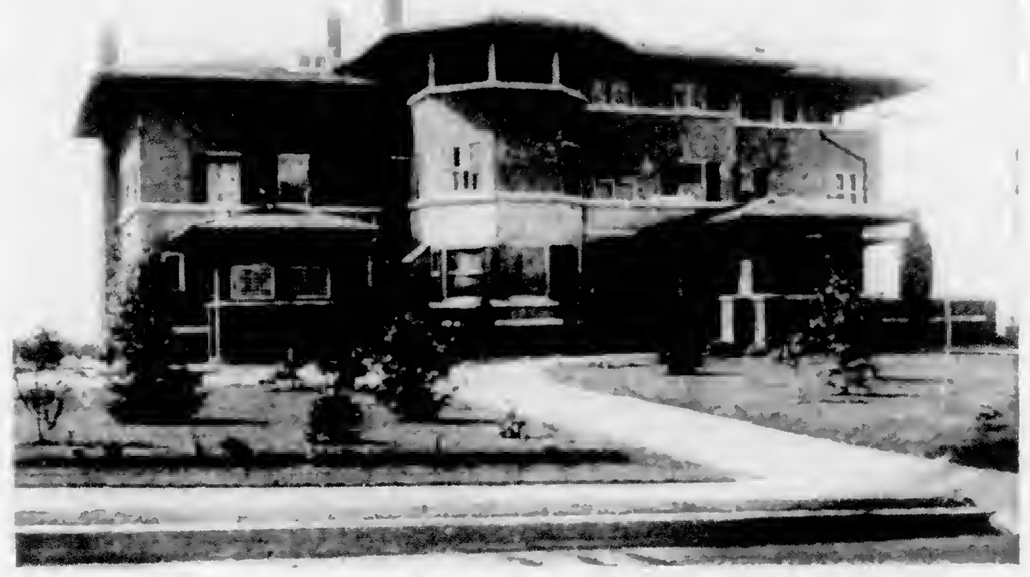
The Koehler Residence, Portland, Ore.
Whidden & Lewis, Architects

The Wilcox Residence, Portland, Ore.
Whidden & Lewis, Architects



Residence of Dr. Wm. Jones. Whidden & Lewis, Architects

Interior of the Geo. Good Residence, Portland, Ore.
Whidden & Lewis, Architects



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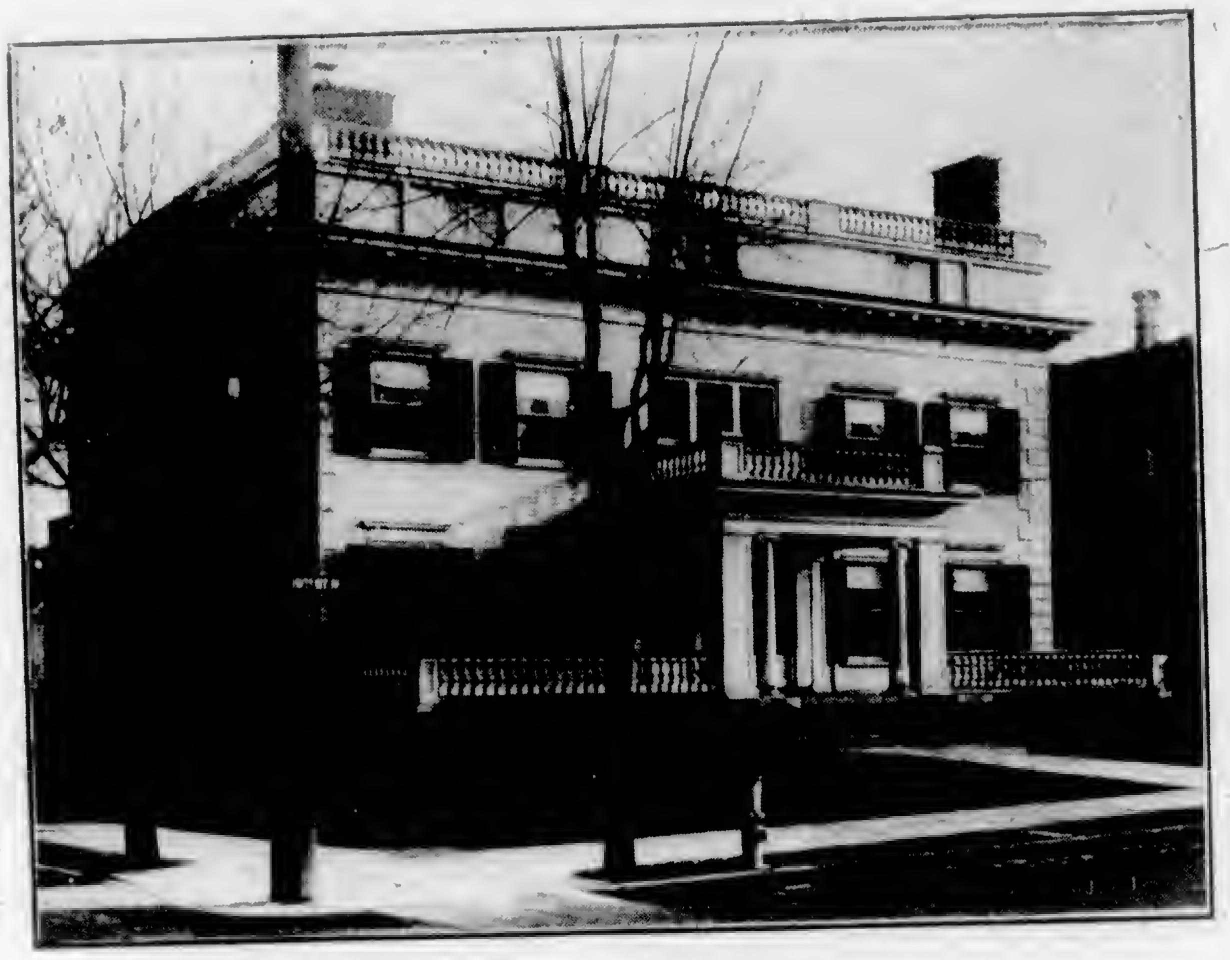

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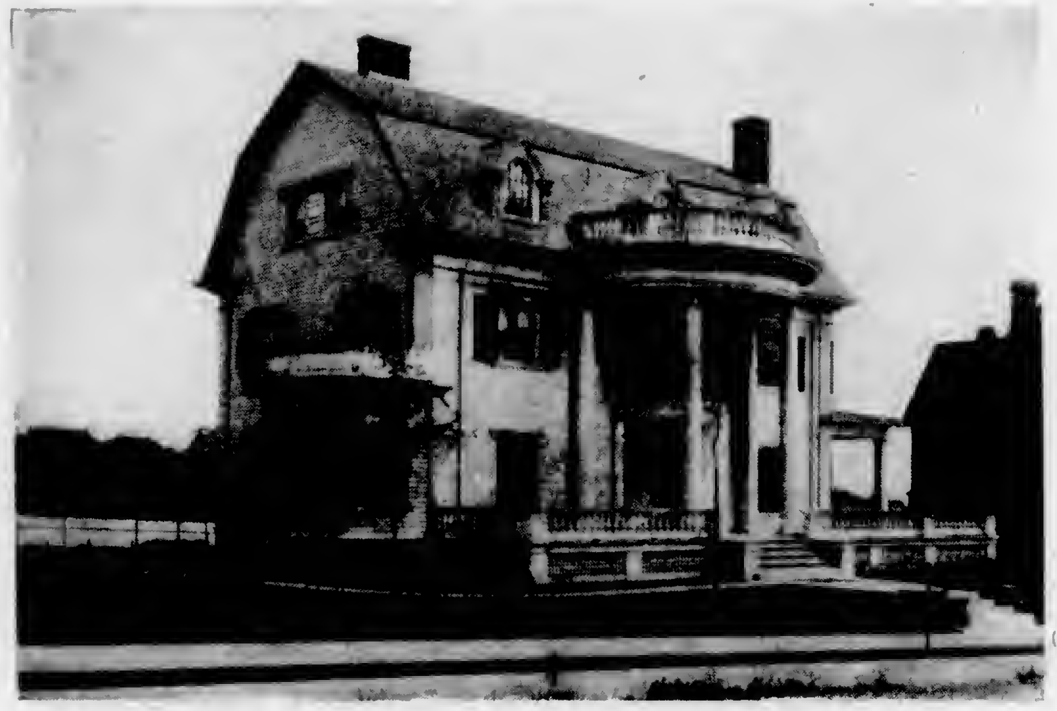

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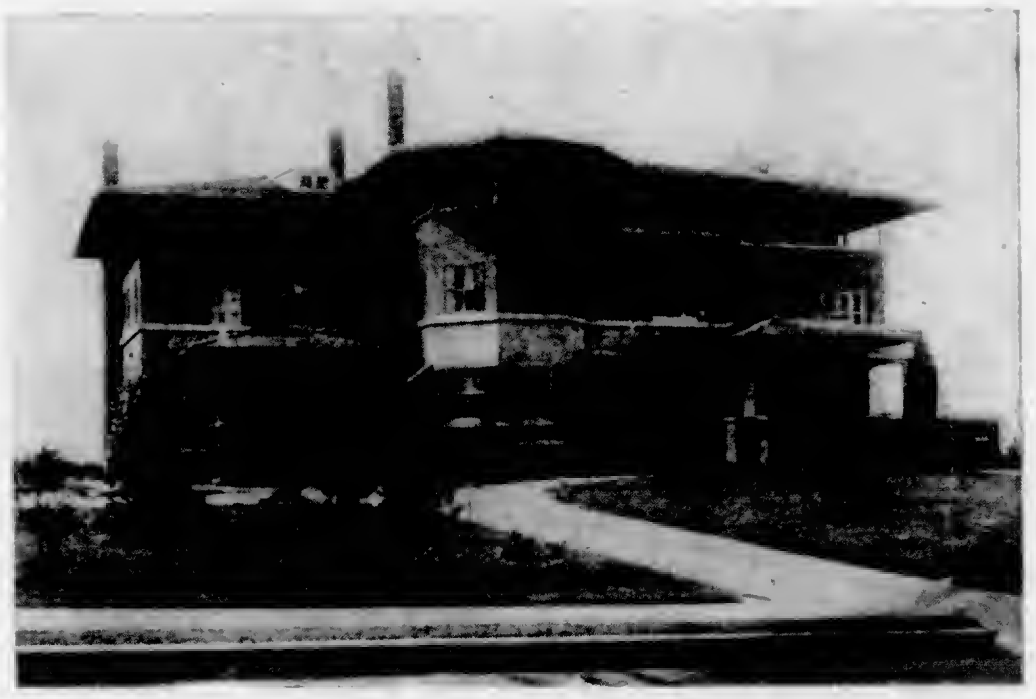

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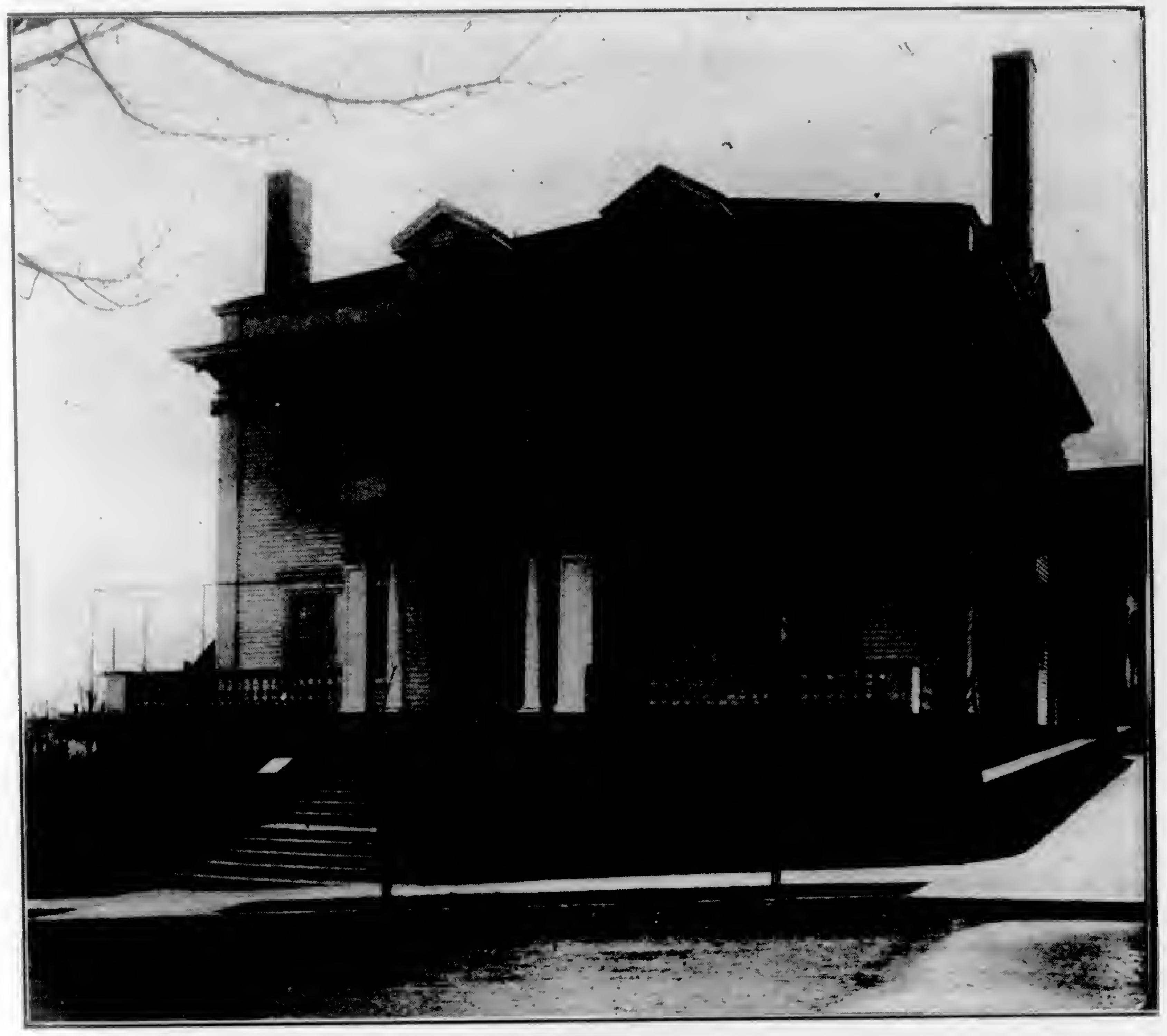


The Lang Residence, Portland, Ore.
Whidden & Lewis, Architects

Zera Snow, Wm. Honeyman, H. L. Corbett, Isam White, W. F. Burrell, T. B. Wilcox, A. Wolfe, Dr. Wm. Jones, A. L. Maxwell and George Good.

Whidden and Lewis' buildings are marked by simplicity of outline and exterior design and skilful and artistic interior arrangement. Their work is also noted for its durability and the absence of veneer or garish effects. They are not alone architects, but also skilful constructionists, and the contractors say that their plans are perfect in detail, requiring no corrections or modification. They are never extremists, although keeping up on all improvements, and their results are evenly good.

Their residences show great economy of arrangement and an understanding of a household's needs. As one lady in Portland expressed it: "I want Whidden & Lewis to build our new house, because they make them so comfortable."

Whidden and Lewis will shortly remove from their present quarters in the Concord building to a larger suite in the new Corbett building.

Mr. Whidden has recently built himself a beautiful residence at Riverside, a suburb of Portland, where he resides with his family. Mr. Lewis is a bachelor and lives at the Arlington Club.

* * *

Do some people a favor and they expect you to keep up the good work until the undertaker gets either you or them.

The Portland Architectural Club's First Exhibit

THE first annual exhibition of the Portland Architectural Club was held in the galleries of the Museum of Fine Arts in the Rose City on January 6th to the 18th. The affair was a success from every standpoint, and so encouraged were those responsible for the exhibit that they have determined to make it an annual feature of the life of the club. The Portland display is to be followed by other exhibitions in the Northwest cities, one having already been arranged for in Seattle.

The work displayed at the Portland show was most creditable. Much praise is due the committee for its selection of drawings, some very clever designs being included in the collection. To specify would require more space than is available at this time. Suffice it to say that the showing made by the Portland architectural profession would compare favorably with the work turned out by any of the leading architects in the East. It is gratifying to note the wide interest taken in the exhibition, not only by the architects, but by the citizens of the Northwest. It shows an unmistakable appreciation of the profession's efforts to achieve a high standard of excellence, and it should prove an incentive for a continuation of this class of work.

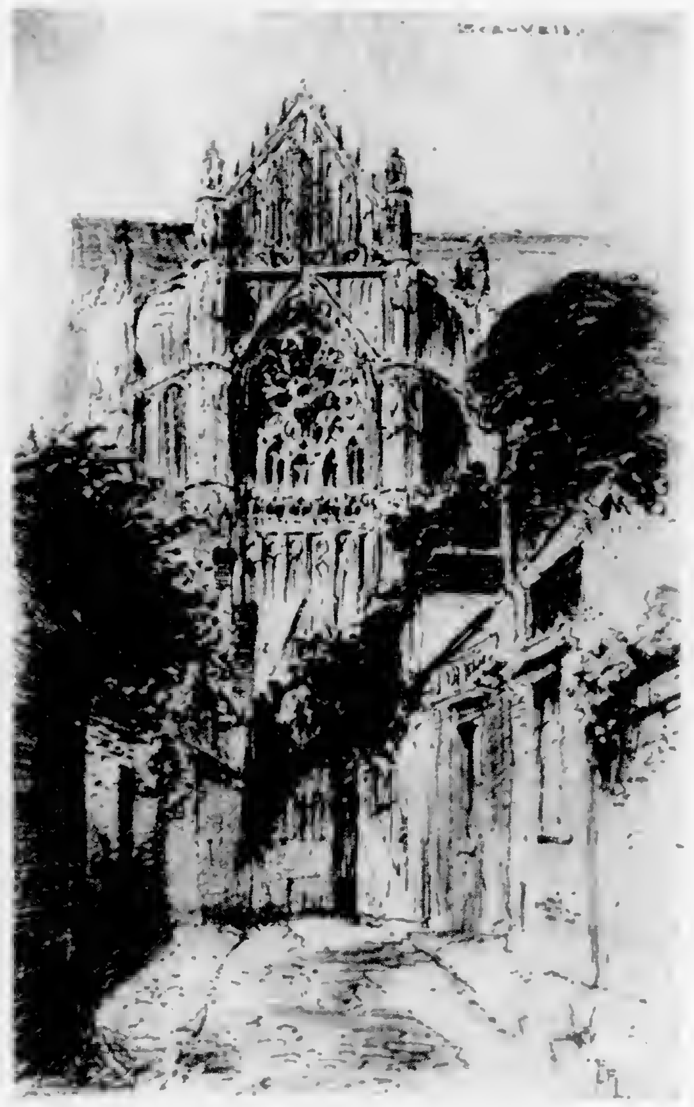
Francis J. Berndt, president of the club, writes of the club's history and work as follows:

The Portland Architectural Club was organized in the spring of 1906 by a few architects, draftsmen and designers in the allied arts. The object of the club is the mutual improvement of its members, to promote a friendly rivalry in architectural designs, to teach and promote a knowledge of architecture and the allied arts and crafts, as well as to protest, on pure professional grounds, in flagrant cases of crying need, in architectural design.

It is also the function of the club to institute and conduct, under able instructors, at stated times, classes in water color, pen and ink work and modeling, interspersed with lectures upon the theory of structural design and the logical use of building materials.

While lectures are considered of great value, they are apt to pall, if used as a regular and sole means of promoting the welfare of the club members, so social entertainments do much to entertain and instill good fellowship among the members. To teach that architecture is a great and progressive art is the primary object of the Portland Architects' Club.

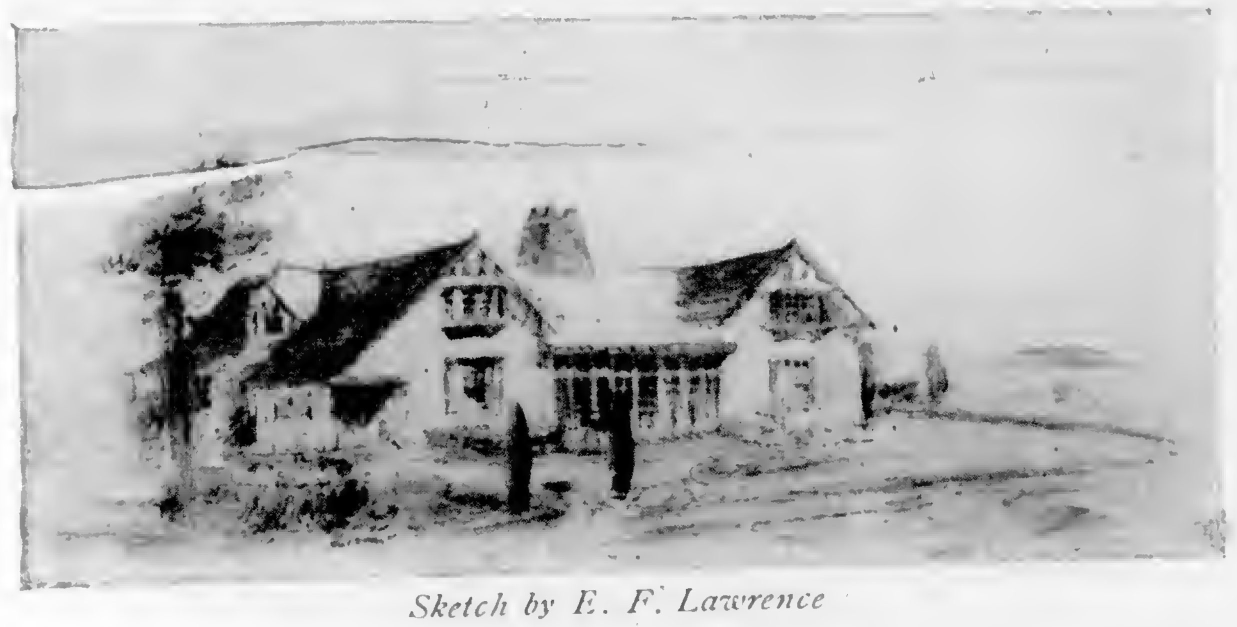
Still another paramount duty of the club is the development of an awakening,



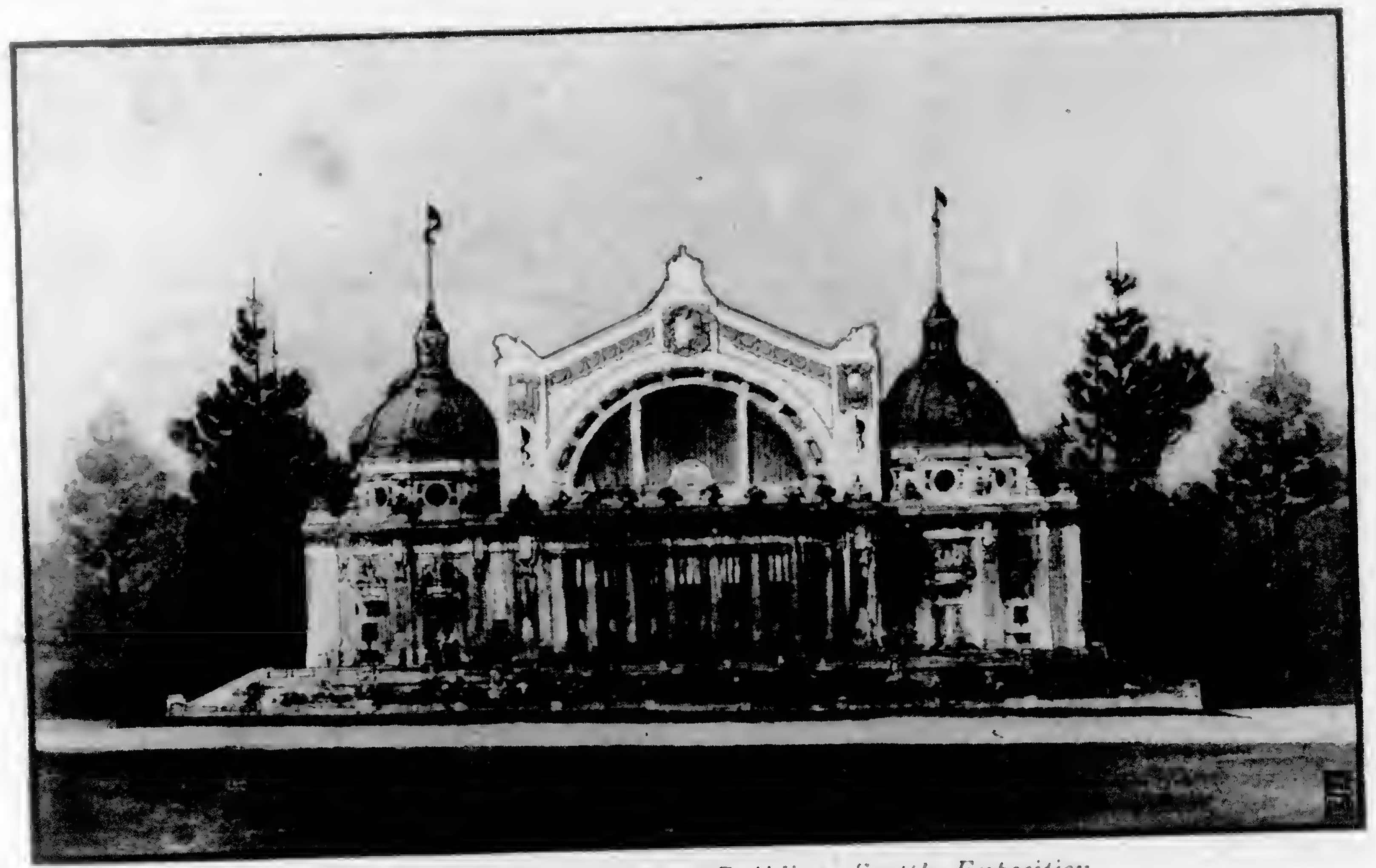
Beauvais by E. F. Lawrence

manifest generally throughout the country of the important bearing material conditions have upon civic development and beauty. The "City Beautiful" will, there is good and sufficient reason to believe, ere long become a household phrase as well as the subject of official sanction.

The club, through its committee on municipal affairs, will urge the placing upon the city's plans the proposed boulevard and park system—a movement which has so frequently of late been discussed and recommended by a few public-spirited citizens who love Portland for her own sake. It need not be questioned that there is any project which means so much to the welfare and advancement of Portland as the construction of such a system of boulevards and parks, with such attendant accompaniments as children's playgrounds, tennis courts, fountains, etc., which must needs be maintained should Portland hope to keep pace with its many rivals, and especially to pass them, since it is essential that our city should be made attractive.



Sketch by E. F. Lawrence



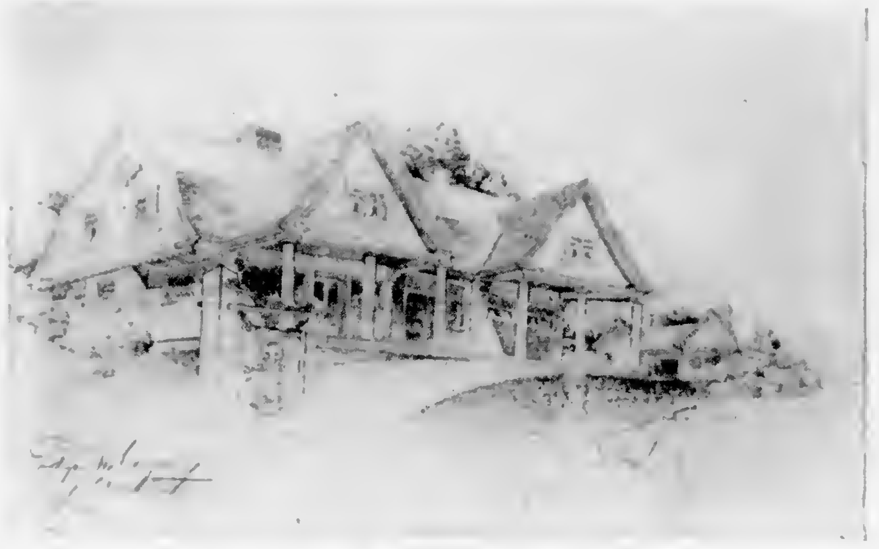
End Elevation Manufacturers' Building, Seattle Exposition

Shown at the Portland Exhibit *Sommervell & Cote, Architects*

It is not alone, however, within the narrow limits of the club that we strive to awaken interest in the question of civic art. Gradually we hope to reach the public and to lead it, and also to impress upon all the importance of aesthetic development as a prime factor of civilization. Indeed, we flatter ourselves that a beginning has already been made.

Residence of Mr. Ishim White. Whidden & Lewis, Architects

The Portland Architectural Club thus clearly defines its position in reference to a "City Beautiful;" it is but a natural consequence that the exhibition held at the Museum of Art in January, should and did serve a two-fold purpose. First, that of placing on record the best work of the year, in that way showing the prevailing tendencies in designs and construction, and, second, that of educating the draftsmen on the one hand and very materially moulding public opinion and sentiment, thus proving helpful to an intelligent public, appreciation and encouragement of architecture, on the other. Without such, the finest of the useful arts and the most useful of the fine arts must perish.



Hunt Club House, Portland
E. M. Lazarus, Architects

House of Mr. R. B. Lamson
Mr. Jos. Jacobberger, Architect

* * *

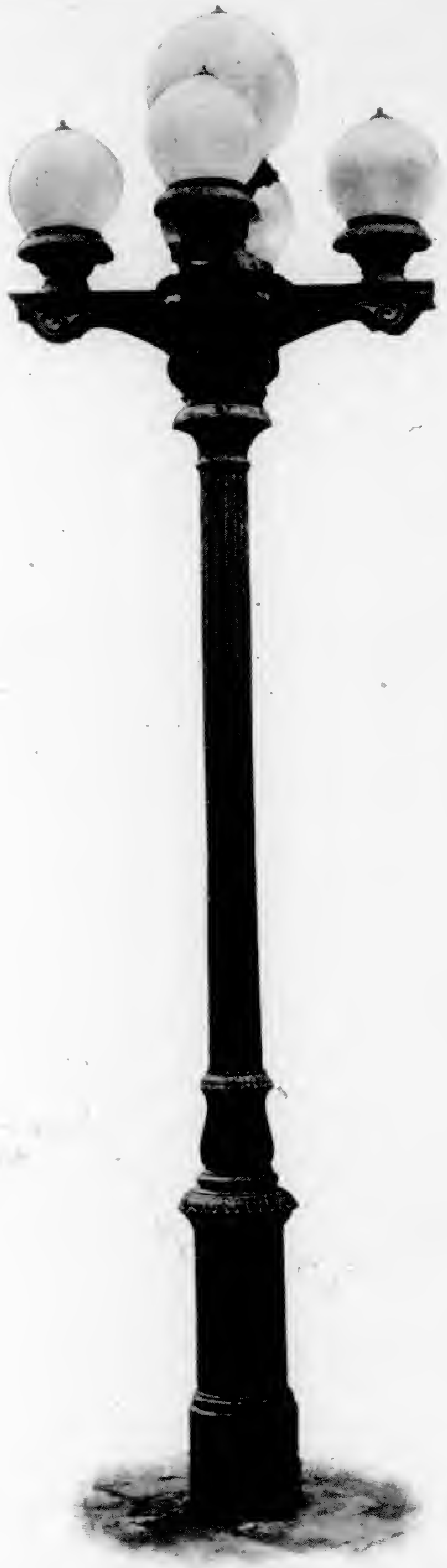
Portland Association of Architects

THE Portland Association of Architects has elected the following officers for the year 1908-9: President, Emil Schacht; vice-president, Joseph Jacobberger; secretary, Otto Kleemann; treasurer, C. C. Robbins; trustee, Carl Sick. Steps were taken to affiliate with the American Institute of Architects, and organize a local chapter in Portland. The objects of this association are to unite the architects for the purpose of stimulating a more friendly feeling among members of the profession and a closer observance of professional etiquette, work for better buildings, and combine the efforts of architects to promote the artistic, scientific and practical efficiency of the profession.

* * *

Teacher—"A rich man dies and leaves $1,000,000 to eight nephews and nieces. What does each one get?"

Scholar—"Automobiles, ancestors and appendicitis."—Life.



Handsome Electrolier Recently Installed at San Jose

Ornamental Street Lighting

Los Angeles

CALIFORNIA cities are falling in line with various eastern towns in adopting ornamental street lights. Los Angeles was one of the first municipalities in the Golden State to adopt the electrolier, and among the other cities to follow suit were San Diego, Oakland, and San Jose. San Francisco, eventually, will have an elaborate ornamental street lighting system, a design by D. H. Burnham & Co. for posts along Sutter street to be installed by the United Railroads Company, having already been accepted. In some instances where the lights are put in, the Chamber of Commerce or Improvement Club engineers the movement, each merchant contributing something towards the expense. The municipality's share in the improvement consists of supplying the necessary lighting power and the employment of some one to keep the lights in order.

City Electrician R. H. Manahan gives the following information regarding the Los Angeles system:

The first lighting by incandescent lamps on ornamental posts in our business streets was taken up by the merchants and property owners on Broadway, working under their organization known as the Broadway Improvement Association. This Association, by means of subscriptions from property owners and merchants along the street, raised funds for installing 135 cast-iron ornamental posts. These posts were located at about 120 feet intervals along each side of the street and originally had installed an aggregate of 384 candle power in 32 candle power incandescent lamps. This would be equivalent to nearly thirty-seven 450 watt arc lamps per block, there being twelve posts per block on this particular street.

The cost of lighting these posts was assumed by the city and as one can readily see from the above comparison, was a very expensive method when considered apart from its advertising and artistic features, and in view of other streets asking for the same improvement, the experiment was tried of reducing the aggregate candle power one-half, with very satisfactory results, both financially and from the standpoint of illumination, the general effect looking down the street being practically the same.

Owing to the difficulty the Broadway Association had in securing subscriptions from all the property owners on the street, an act was passed by the State Legislature enabling property owners along any street to institute proceedings for improvements of this character. Under favorable action by the city council an assessment district was formed upon which the cost of the improvement was levied in the same manner as is done in ordinary street improvement work.

The three other principal streets upon which the ornamental posts are now installed used the assessment method and it has been very satisfactory in operation.

We have, as you will see by the photos, two general types of posts, the four-arm and the six-arm, with 16-inch or 18-inch top globe.

The six-arm post is the one adopted by the Broadway Association and the present arrangement of lamps consists of three 32-candle power lamps in the 18-inch top globe and one 16-candle power lamp in each of the 8-inch enclosing frosted globes.

The four-arm post used on the other streets contains three 8-candle power lamps in each 12-inch globe on the arms and three 32-candle power lamps in the 16-inch top globe.

Provision has been made on the later posts erected for extra circuit wires, which may be used for decorative lights strung along or across the streets. The connections to these posts were installed by the respective lighting companies at their own cost. Having underground conduits already in the street, they simply ran the necessary service wires from their manholes to the posts at a nominal expense.

Lighting hours for these posts vary according to the conditions. On the main business streets all posts are lighted until midnight and after midnight two posts at each street intersection. In the semi-residence section all posts are lighted until 10 o'clock and balance until 12 o'clock or later, as desired by the property owners.

In the following tabulated form I have shown the extent and original cost of installing the posts, including globes and necessary wires to the base of the post, at which point the lighting company connect their service wires, also the total cost, and cost per front foot for current for one year.

In conclusion, it is my belief that in view of the rapid improvement being made in the incandescent lamps, both as regards efficiency and candle power, the lighting of streets both in the business and residence section can be done quite economically considering the artistic effect that can be obtained with ornamental posts and incandescent lamps.

In connection with the lighting of these posts by the various companies I neglected to state that the entire maintenance of the posts is made a part of their contract, this including all necessary repairs to wiring, broken globes and renewals of lamps and necessary cleaning and washing of the enclosed frosted globes. All lamps are renewed at the expiration of 800 hours burning so that the post shall be as uniformly lighted as possible, lamps burning out or becoming defective before the 800-hour period being, of course, renewed immediately.

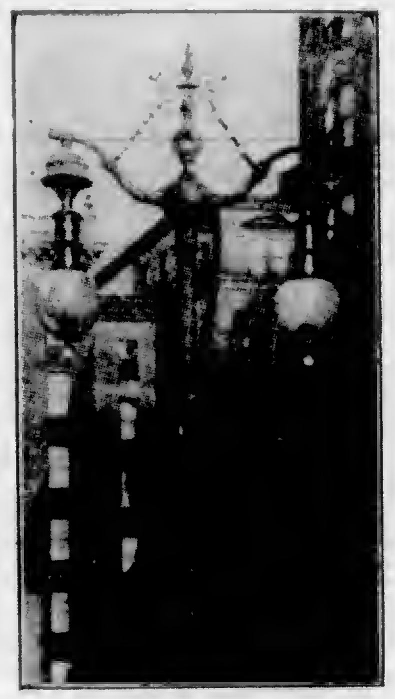
The cost of lighting these four streets has recently been taken up by the city with the respective property owners and the city agrees to assume one-half such expense, the balance being collected by the method outlined in the legislative act to which I referred. We have before us petitions for four other streets for similar improvements, but in these cases the entire cost for installation and current will be paid by the property owners.

Denver

Mr. Henry Read, Chairman of the Art Commission of the city and county of Denver, in a letter dated September 21, 1907, gives a description of the ornamental lighting of Sixteenth street, one of the main business streets of Denver.

He says the posts were designed to furnish a support for the span wire of the electric railway system and also to provide for carrying the feed wires on top, as well as to provide for the ornamental lamps. The outer casing of cast-iron was made larger on account of having to stand the strain of the span wire than would otherwise have been necessary. The poles were set at a distance of about 90 feet, on each side of the street. There are four pairs of standards to the block, set in the curb, those on the street intersections being placed two feet outside the lot line of the transverse streets. Blocks 266 feet, including 16-foot alleys. Street 80 feet wide, including the sidewalk. The lamps are alternating current enclosed arcs of 110 volts, 6.6 amperes, in opal globes; the outer one only being used so as to present a single line vista down the street. Eleven blocks were so lighted at a uniform cost of $60 per lamp, under a provision granted the Denver Gas and Electric Company. The expense is borne by the city at large. The total cost of equipping this street was about $16,000. The merchants of other downtown streets are insisting that the new municipal lighting be extended to other principal streets of the city.

Mr. William J. Carter, Chief engineer of the Board of Public Service, of Cleveland, Ohio, states that the lighting of the downtown streets is taken care of by the abutting property owners or business firms, the city allowing the section of the street upon which they maintain their lights the expense of operating enough lights to provide the necessary street lighting. This lighting costs the abutting property owners about $3.00 per front foot per year. The lamps are arc lamps, 220 volt, hung in pairs and spaced about 100 feet apart.



Rochester

Rochester has had its principal main streets lighted for several years with arc lamps hung in pairs on iron poles used generally with the railway company as trolley poles. These lamps on Main street are spaced about 100 feet apart on each side of the street, and present a very brilliant appearance. This lighting is paid for entirely by the city at large. Buffalo, Syracuse and some other cities light the main streets in a similar manner. The main street in Rochester has a more brilliant illumination than any of the others that I have observed.

Mr. Manahan, of Los Angeles, states that in Pasadena they have approximately twenty blocks on three of their business streets lighted with twelve 16-c. p. incandescent lamps, arranged on each post. He was unable to give any information as to the cost of the posts or of the lighting. He says they are very much less expensive than the type in Los Angeles, and he considers them better adapted to park or residence lighting than for business streets, "as they do not possess the dignity, to our prejudiced minds, required by streets of staid and financial aspect."

The Public Lighting Commission, of Detroit, Michigan, in its report for the year ending June 30, 1907, says the tower system used by the city in connection with the street lighting is a unique feature. These lights may be seen many miles. There are now 135 towers in use, classified as follows:

1	165 feet in height
2	160 feet in height
107	150 feet in height
18	125 feet in height
7	100 feet in height

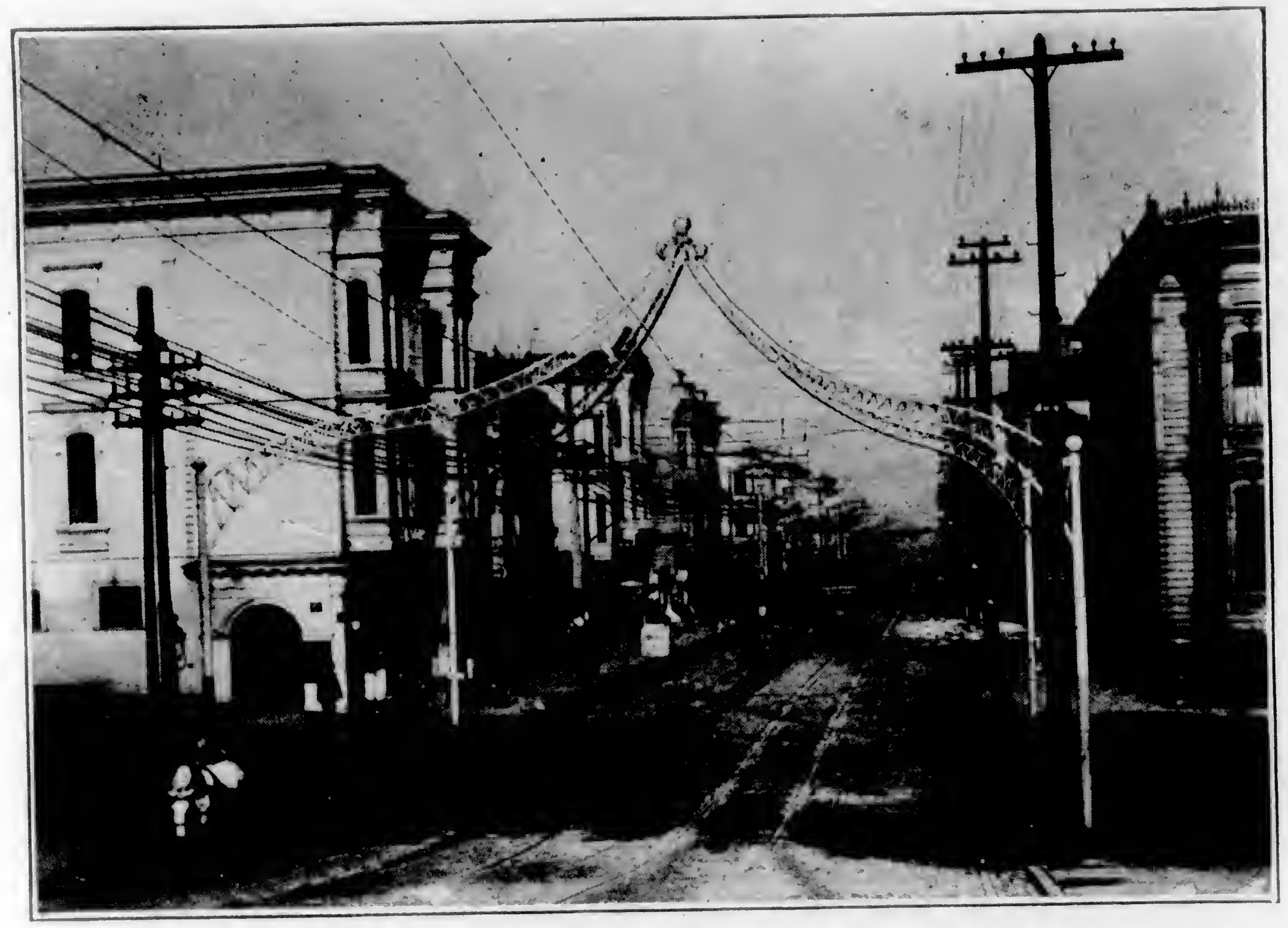
Of these towers, one in the central portion of the city has six arc lights, 64 have four arc lights each, and 70 have ornamental poles with double arc three arc lights each. There are also 30 lights and 310 ornamental poles with single lights.

The idea of lighting San Jose's principal streets by cluster lights on poles along each side of the street, was under consideration for over a year before it was finally adopted.

The electroliers in San Jose in general makeup and beauty of design have been pronounced superior to the Los Angeles article, which have attracted the attention and admiration of all the tourists to that city.

The design is that of an ornamental iron pole, well above the heads of passersby on the sidewalks, and surmounted by a beautiful cluster of globes. There are four globes springing at right angles to one another topped by a larger one, containing three lamps, the others having one each. These lamps are of the highest efficiency, of thirty-two candle power each.

The column and cluster are finished in an excellent representation of Romanesque bronze, whose elegant metallic green effect is so pleasing to the connoisseur of antique metal work. As a whole the individual lighting columns are ornaments to the street upon which they are placed.



Cast Iron Ornamental Arches set with Incandescent Lights. Fillmore Street. San Francisco

The Joshua Hendy Iron Works, of San Francisco and Sunnyvale, manufactured the castings and are responsible for the artistic and structural excellence of the design.

The original effort in introducing the electrolier on this Coast was made just before the earthquake. Architect Albert Pissis designed a very attractive post, which served the double purpose of a ventilator and an ornamental light. Sixteen of these castings, cleverly executed by the Joshua Hendy Company, were placed in front of the Emporium building. They were not seriously injured by the fire, and with the rehabilitation of the Emporium will again be placed in service.

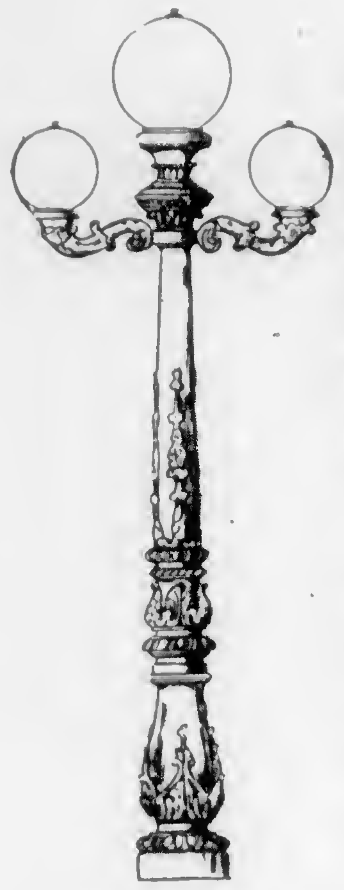
TABLE SHOWING DETAILS AND COST OF INSTALLATION OF ORNAMENTAL LAMP POSTS IN THE MAIN STREETS OF LOS ANGELES AND COST OF LIGHTING THE SAME.

Street	Length in Feet	Number of Posts	Candle Power per Post	Total Candle Power	Cost of Installation	Cost per Front Foot	Cost per Post
Hill	8,445	164	192	31,500	$17,294	$0.94	$105.25
Broadway	7,125	135	192	25,900	24,000	1.00	103.00
Spring	5,750	132	132	25,300	14,628	1.06	110.00
Main	9,420	163	192	31,300	19,000	1.10	116.00
Totals	5.8 mi.	594	192	114,000	54,922	....	......

COST OF LIGHTING OF ORNAMENTAL POSTS

Street	Rate per K. W. Hour	Yearly Cost	Cost per Front Foot
Hill	3¾ cents	$9,200.00	$0.50
Broadway ...	3¾ cents	7,780.00	.556
Spring	3¾ cents	7,625.00	.65
Main	3¾ cents	9,810.00	.568

Furnished by R. A. Manahan,
City Electrician.



Oakland

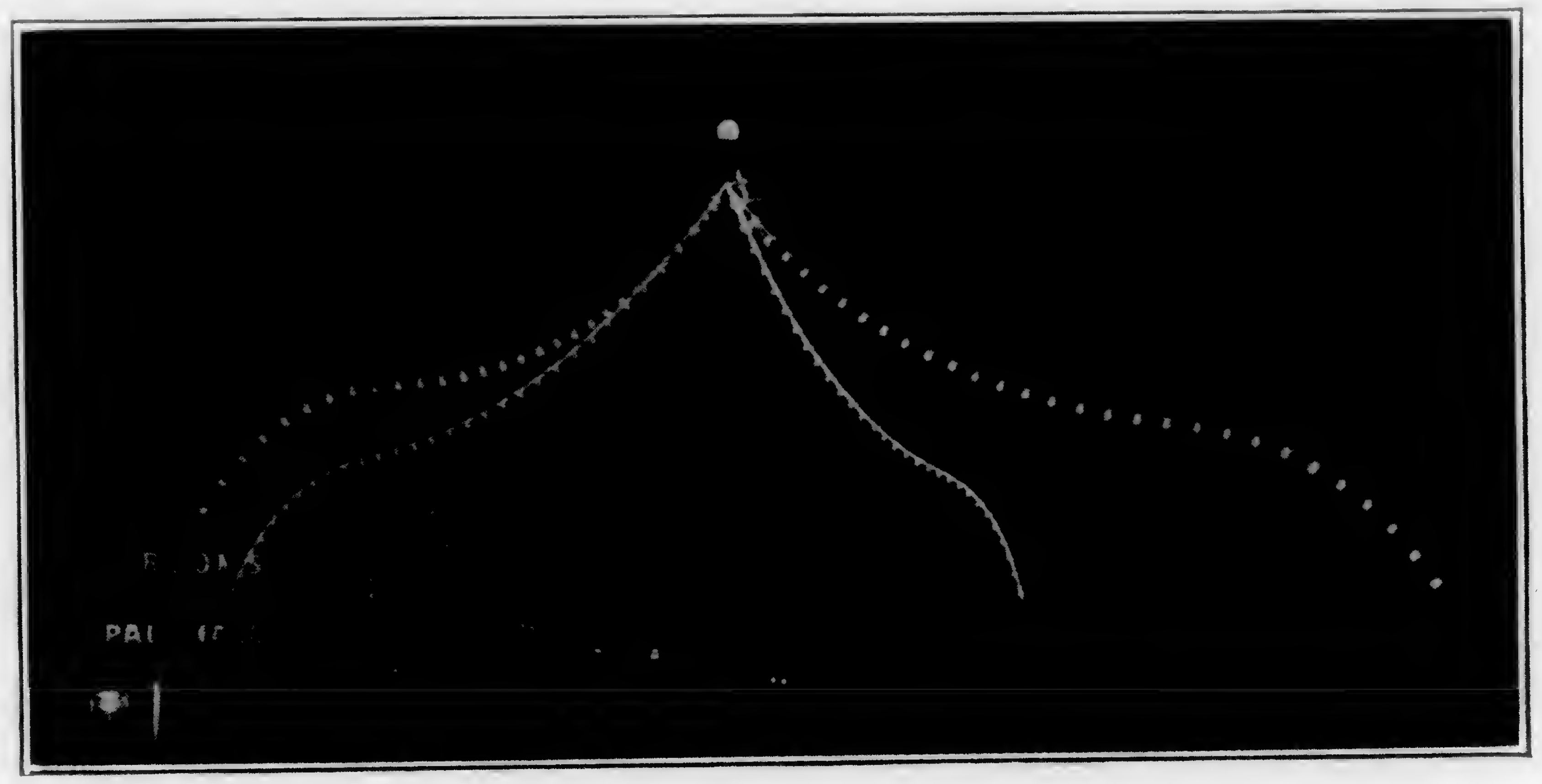
Through the enterprising spirit of the Fillmore Street Improvement Association of San Francisco, an innovation in street lighting has been developed. It was decided to illuminate Fillmore street from Fulton to Sacramento streets, a distance of over a mile, in as decorative and effective a manner as possible. All available sources of illumination were considered, including the newer types of flaming arc lamps, and it was finally decided that the ordinary carbon filament incandescent lamp produced the greatest decorative effect, and could be placed in a way that would be festive and pleasing to the eye. It was agreed that the different types of arc lamps gave out a much more brilliant light, but this was not the essential feature to be arrived at. Besides, the intensely brilliant light would in a measure, owing to the contraction of the iris of the eye, depreciate the illumination in the show windows.

The design finally agreed upon consisted in the erection of a double span of curved trusses, as shown in the accompanying illustration, across the four corners of each street crossing. This truss work is built up of five-inch channels, with 1½ inch by ¼ inch lattice work, the four arms being fastened together by a swivel joint. Each arch weighs about two tons and the maximum span from pole to pole is eighty-two feet. Extra heavy steel poles set in concrete are used for supporting the arches.

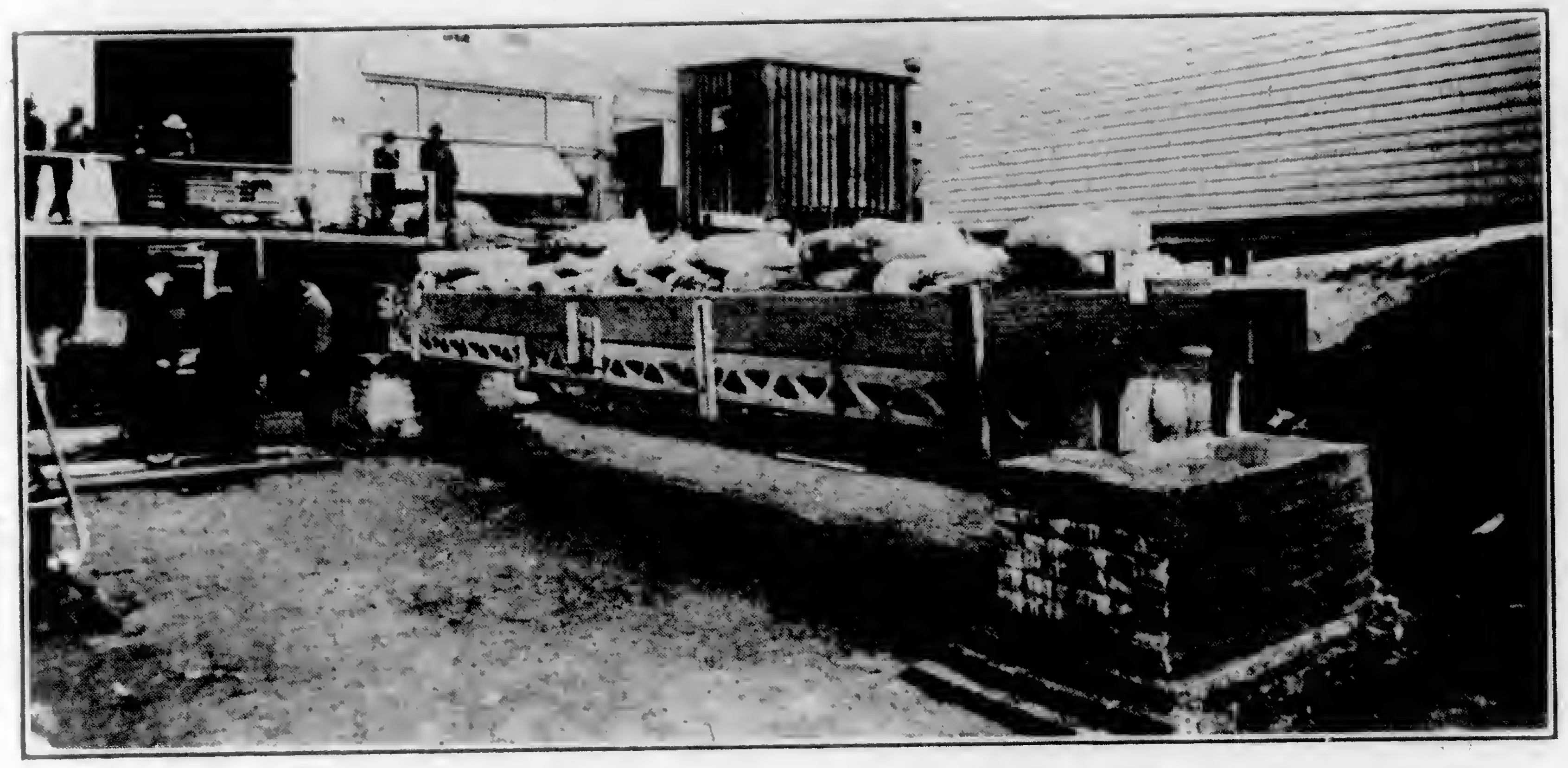
There are 130 16-candlepower incandescent lamps on each arch. Weatherproof sign sockets are used and the wires are run through a trough formed by fastening a plate over the flanges of the lower channel, which effectually conceals them. A three-pole knife switch and fuse cut-out is placed in a cast iron box fastened to the pole of each arch. The entire arch is painted a pure white color.

The current was first turned on the arches on Thanksgiving Eve, and they have been illuminated each evening since that time without interruption. The results have proven very satisfactory.

The work of erecting the arches was carried forward by the Butte Engineering & Electric Company at a cost of $10,000. The Central Iron Works fabricated the steel.



Glimpse of the Fillmore Street Arches at Night



Visintini Beams Under an Initial Load of 9,000 Pounds

Test of Visintini Beams

By EDW. L. SOULE

ON DECEMBER 7, 1907, three reinforced concrete beams of the so-called "Tiny Visintini" system were subjected to a test loading sufficient to result in their destruction and to afford opportunity to exploit the merits of this particular type of trussed construction under damaging loads. In what follows, it is intended to give the data and conditions of the test specimens, loadings and method of the testing, from information noted at the site and further supplemented by the contractor performing the test.

The "Tiny" system, as will be seen in the accompanying photograph of the beams, adapts reinforced concrete trusses of the Warren type in place of the usual solid reinforced concrete beams. Each of these shallow trusses were reinforced with two ½-inch round bars in the compression flange, two 1-inch round bars in the lower or tension flange. The tension diagonal members were formed by inclining ½-inch round bars at 45° between the upper and lower reinforcement bars and securely attached to them by wiring. No bars were used in the web members, which were strained in compression. The diagram shows the truss arrangement of reinforcing.

The metal trusses when combined, were placed in the forms, which consisted of a bottom plank, holding triangular metal bosses the same shape as the spaces in the trusses; these served as guides for the cores around which the concrete was deposited. The beams were cast on their sides and remained in the molds about a day. The concrete was composed of 1 part of a domestic brand of cement, 1½ parts of uniform granular beach sand, and 3½ parts of sharp gravel graded to pass a ¼-inch ring and was mixed wet.

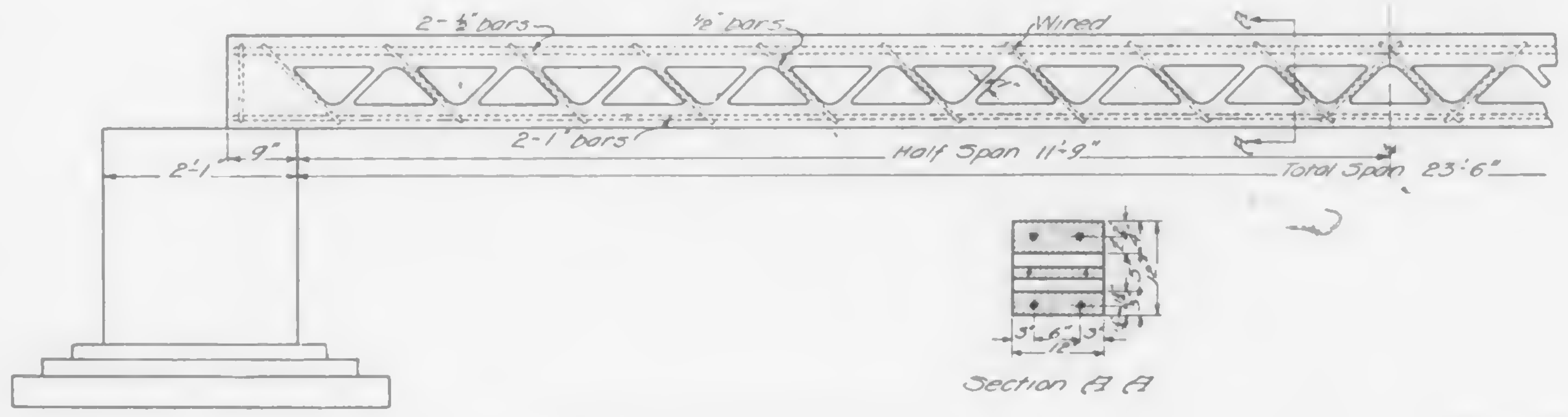
The beams were molded 12 inches wide, 25 feet in length, 12 inches in depth with a compression flange of about 4 inches thick, and the tension protecting flange of about 3 inches. The thickness of the diagonal members was 1 inch. After being removed from the molds, the beams were positioned as in practice and allowed to remain for about nine weeks. At the expiration of this period they were placed upon brick piers, previously constructed, so as to lie in close contact laterally and the joints were filled with a grout of 1 part cement and 1 part sand. The brick piers were 2 feet 1 inch wide by 4 feet 8 inches long and 3 feet high, affording a clear span of 23 feet 6 inches. The piers were constructed of an average grade of brick and the mortar did not appear to develop high bonding qualities.

To insure uniform distribution of loading, a 10-inch layer of sand covered the area of beams; cement sacks filled with sand were then distributed until the load was increased to 9000 lbs. total or 127 lbs. per sq. ft. The loading was discontinued for a week and an examination was made, which showed a deflection of about ¼ inch. The beams were 10 weeks old when pig iron was used for the remaining loading material, the increments of loads being generally about 2500 lbs. No precautions were taken to prevent the arch action. Deflections were recorded after each loading by measuring the vertical movment at the center of the beam with reference to an established scale fastened to an upright post. The deflections given in the following table are the average for the two outside beams as taken by one observer:

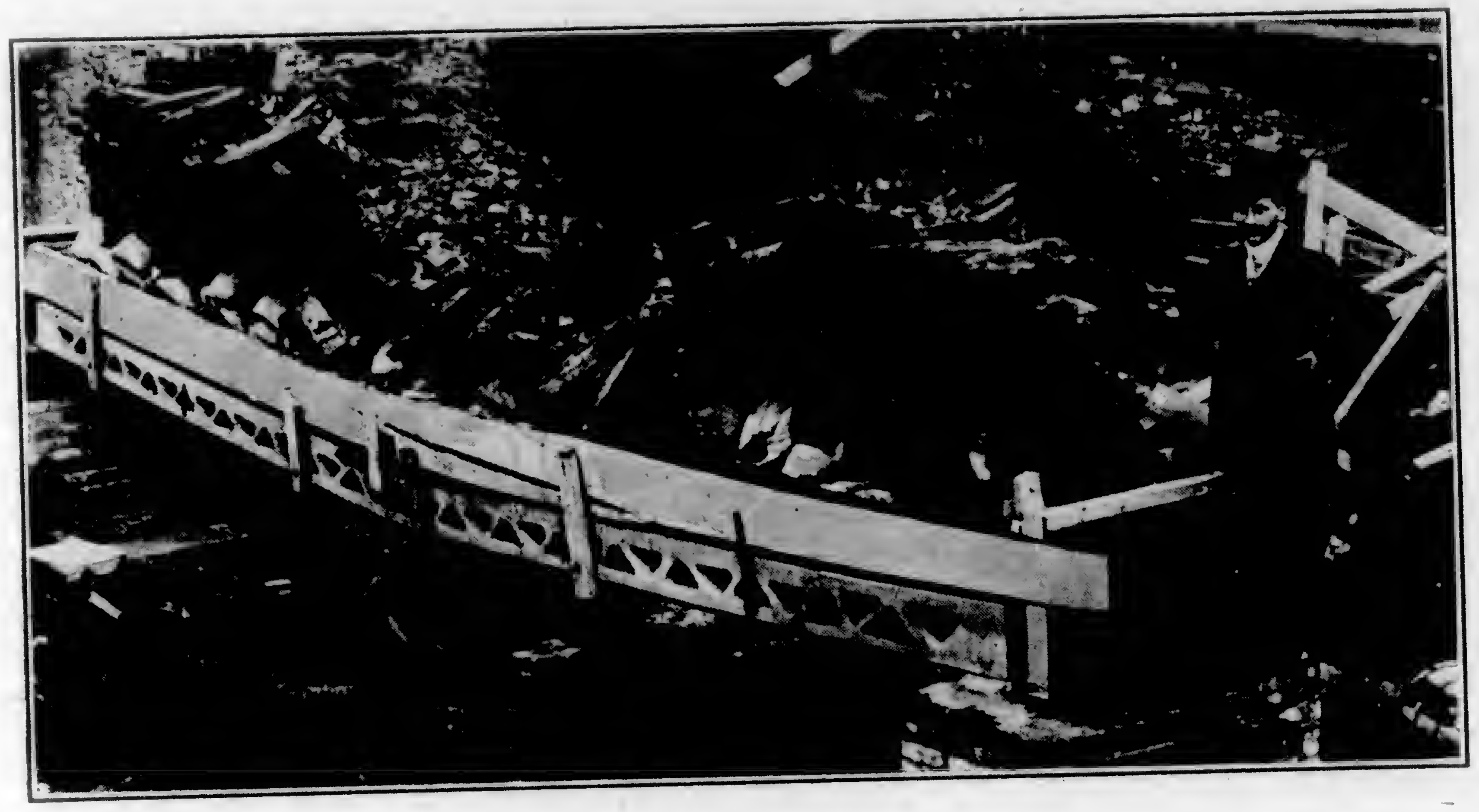
Total Load (Lbs.)	Load per Sq. Ft. (Lbs.)	Deflection (Inches.)	
16,000	227	¼	
20,000	283	5-16	
22,600	320	⅜	
25,200	357	½	
27,700	393	⅝	
30,300	430	¾	
32,900	467	⅞	
35,500	503	1 1-32	
38,100	540	1 3-16	
40,800	578	1 5-16	
43,400	616	1½	
45,200	641	1⅝	(Cracks in brick piers.)
48,200	683	1¾	
51,300	727	2	
54.500	772	2⅛	(Elastic limit.)
55,900	793	2¾	(Cracks opened up in lower flange.)
57,500	815	3½	
59,100	838	5	(Cracks expose steel.)

The above loads include the dead weight of the beams taken as 100 lbs. per sq. ft. concrete being assumed at 150 lbs. per cu. ft.

Mention should also be made here of the approximate method of determining the deflections, which did not include the settling or crushing effect of the brick piers. At the load of 43,400 lbs. it was evident that the piers had settled, which was not accounted for by measuring the deflections at the center of the beam. Correction in the deflection should be made because of the settlement, and this makes the readings uncertain by perhaps as much as ¼ inch.



Showing Truss Arrangement of Reinforcement



Beams After Final Test

The beam was designed for a live load of 125 lbs. per sq. ft., allowing a stress of 650 lbs. on the concrete in compression and 14,000 lbs. per sq. in. on the steel. Calculation according to the straight line distribution of stress and varying ratio of moduli shows the following stresses:

	Concrete Stress.	Steel in Compression.	Steel in Tension.
L. L. at 125 lbs.....	710 lbs. per sq. in.	4,550 lbs. per sq. in.	12.800 lbs. per sq. in.
Elastic Limit.........	2150 " " "	21,500 " " "	44,100 " " "
Ultimate Load	2220 " " "	27,100 " " "	48,300 " " "

As the last increment was being put on, one of the beams deflected more than the others, causing the load to shift and momentarily support an unequal proportion of the load. This caused the elastic limit of the steel to be exceeded and resulted in crushing the compression flange. The accompanying picture shows the condition of the beams after a part of the load had fallen to the ground.

The test was prepared and executed by Jörgensen Bros., who control the patent for this locality. L. Mess was the consulting engineer.

Hassam Pavement on Webster Street, Alameda

Laying the Hassam Pavement on Webster Street, Alameda

Hassam Pavement on Webster Street, Alameda

By W. A. LUEY

DURING the last twenty years the Webster street roadway has been an eyesore and a bone of political contention in the city of Alameda. It is, so to speak, the main artery connecting Alameda with the outside world, approximately two thousand teams of all descriptions passing over the thoroughfare daily.

Lying across a salt marsh, which varied from seventy feet up in depth to hardpan, the roadway had been filled in from year to year with materials of divers kinds until a crust six feet to eight feet thick, or more, had been formed on the marsh. The upper portion of this crust consisted of broken rock, clay, sand, etc., which readily worked into chuck holes in continued wet weather and baked into a solidly cemented mass in the summer heat. The result was a roadway which was nearly impassable in the winter time and which was, to say the least, very uncomfortable in the summer.

After a thorough investigation it was decided that the results of piling the foundation would be uncertain because soundings failed in places to show any bottom, and consequently, skin friction alone would have had to be depended upon to keep the piles in place. Further, it was found that the interest on the investment necessary to pile the roadway would be sufficient to repave it every twelve years, if not oftener; hence the idea of piling was abandoned, and recourse taken in that form of pavement which from all standpoints seemed best to meet rigid requirements of the case—namely, Hassam cement macadam pavement.

The following extract from specifications will show the manner in which this pavement was laid:

"Upon the finished sub-grade broken rock shall be spread to a sufficient depth to bring the surface, after rolling, to the proper finished grade of the street which shall be at least six (6) inches above the sub-grade.

"This rock shall then be thoroughly compacted by rolling with a steam roller giving a compression of not less than two hundred fifty (250) pounds per inch width of roller, and shall be firmly bedded and the voids reduced to a minimum. Such portions of the pavement as it may be impossible to roll shall be thoroughly compressed by tamping.

"The voids in the rock shall then be thoroughly filled with a grout consisting of one part of Portland Cement to two parts of sand. This grout shall be sufficiently thin to flow freely and shall be thoroughly and continuously mixed, and poured upon the rock until all the voids are filled and the grout flushes to the surface under the rolling or compression which shall immediately follow the grouting and be continued until no further compacting results.

"Upon the surface of the pavement thus prepared shall be placed a layer consisting of one part Portland Cement, one part sand, and one part pea-stone, which shall be thoroughly mixed and spread and brushed even and smooth over the entire surface which shall again be thoroughly rolled. This pea-stone layer shall have just sufficient thickness to insure the complete filling of the voids in the pavement surface.

"After rolling, this surface shall be broomed until the surplus water is removed and the surface presents a true and even appearance.

"All operations shall be carried forward with as much speed as is possible and in no case shall cement be rolled or compressed or worked after it has taken its initial set.

"A template, the upper edge of which conforms to the contour of the finished grade, shall be placed transversely across the street at the point where the work of each day stops. This template shall be removed before continuing the grouting, care being taken not to disturb the set of the cement next to the template."

The contractors and city officials used every possible precaution in the selection of materials, allowing the use only of the best. The work was carefully done in every particular, and the resulting roadway is a uniform and homogeneous mass of remarkably dense concrete macadam.

The density of a pavement is a quality whose value is too often overlooked. Here we have a pavement which is capable of sustaining a very considerable traffic before any cement has been applied. It is, in all essentials, a mass of solidly rolled macadam, the component parts of which are closely packed and locked together by the weight of the heavy roller. The filling of the voids in this rock with a rich grout; the thorough rolling of this grouted macadam to insure an absolute and perfect penetration of the grout; the rolling into the surface thus prepared of a thin layer of pea-sized broken stone mixed with equal parts of cement and sand—every one of these processes tends to make the pavement remarkably dense. They insure the use of all the cement grout that can possibly be forced into the voids of the packed stone, and no more. In other words, the resulting concrete very closely approximates the ideal.

A woodworker wishing to glue two blocks of wood together applies the glue and tightly clamps the pieces. To obtain a joint that will hold, the clamping is recognized as necessary. It drives out the surplus glue and brings the fibres of the two sticks in contact with each other. If the blocks were simply glued without clamping, a decidedly weak bond would be formed. There is a similar distinction between Hassam cement macadam and ordinary concrete.

Two points concerning which there was at first a little skepticism were satisfactorily cleared by scientific tests made by City Engineer Poyzer and City Chemist Cunningham. The first was as to whether the grout filled the voids throughout the entire depth of the pavement; the second was as to whether the sand and cement did not segregate, the sand settling to the bottom and not carrying sufficient cement to bond itself rightly. A place was selected by the Superintendent of Streets and the City Engineer at the highest point of crown, where it was agreed the pavement would be weak, if anywhere, and a block two feet square was drilled out. The drilling showed every void perfectly filled with grout; and the results of City Chemist Cunningham's investigations proved that the proportion of the cement to the sand was satisfactory throughout the entire depth.

The Hassam pavement was invented by Walter E. Hassam, former president of the Massachusetts State Highway Association. No better idea of the merits of the pavement can be given than by stating that nearly 90% of all the contract paving laid in Massachusetts in 1907 was laid by this method.

Snow White Portland Cement

PORTLAND cement has easily demonstrated its superiority to all other building materials in respect of strength, convenience, durability and cheapness; only in one quality, that of beauty, has it been found wanting. It is true that a vast amount of ornamental architectural work in concrete is being produced, much of which is of a very artistic character so far as form and surface are concerned, but all showing the drawback of an uninviting color. In comparison with the red, buff or white of terra cotta, the warm tints of granite or sandstone, or the clear white of marble, the monotonous blue-gray of ordinary Portland cement concrete offers a dreary contrast. For this reason the use of Portland cement in the field of ornamental architecture has been limited, and has been confined, for the most part, to a class of buildings in which beauty is not an essential consideration.

It is generally agreed that a true white Portland cement, equal to the best gray Portland in hardening and lasting qualities would fill a definite want and find extensive use. It would be available not only in the field of purely ornamental architecture, such as bas-reliefs, statuary, monuments, vaults, columns, urns, foundations, tile, mosaic, panels, etc., in which, either with or without the addition of the ordinary pigments, architects would be enabled to produce artistic effects not heretofore obtainable; but in the wider field of civil architecture, for exterior and interior finishing, partitions, floors, ceilings, etc., in which, with the element of beauty added to those of strength, convenience, durability and cheapness, it might be expected to quickly supersede the classes of material now commonly used for such construction.

The question has often been asked, "Can a white Portland cement be made?" and this has generally been answered in the negative. There are many difficulties to be overcome in making such a product; suitable materials are not only of most rare occurrence, but if found, require a process very different from the ordinary one of cement manufacture; and such deposits of suitable material as have heretofore been found have not been large enough to justify the expense incident to its manufacture. For these reasons, though many attempts have been made to produce a white Portland, and success has often been heralded in press notices, the product has not hitherto been found in the markets of the world. As substitutes, gypsum plaster in various forms, notably in the improved composition known as Keene's cement, has been widely used. It is well known, however, that gypsum plaster is rapidly attacked by water and will not stand exposure to weather. The use of such materials has, therefore, been confined to interior ornamentation. Certain other classes of cement, of white, or nearly white color, such as slag cement and the "grappier" cement made by grinding the residues from hydraulic lime manufacture, are made and to some extent used in Europe, and some of them, notably Lafarge, have found quite a sale in the United States. But these so-called white Portland cements are so far inferior in strength and hardening qualities to true Portland, that they have failed to gain any important foothold. Moreover, it is only by a considerable stretch of imagination that they can be called white, since, upon setting up, they assume either a light gray or light blue tinge, sufficiently assertive always to emphasize the fact that they are not white.

The announcement is now made that Mr. Spencer B. Newberry, after a series of experiments extending over the past fourteen years, with a large deposit of suitable material discovered near York, Pennsylvania, has perfected a process for the manufacture of a true white Portland cement. It is stated that this product is of a pure white color, that it will pass the Portland cement specifications of the American Society for Testing Materials, that it is at least equal in strength, setting and hardening qualities to the best gray Portland on the market, and that, mixed with white sand, crushed white quartz, ground marble, or ground white limestone, it will produce a brilliant white concrete or white artificial stone, suitable for every character of finish and decoration, at but little more cost than that of ordinary Portland cement concrete.

Generally speaking, the truth of such an announcement might be accepted with some hesitancy. It may be said, however, that the source of this announcement is one that cannot well be questioned. The standing and attainments of Mr. Newberry as a chemist are of the very highest character, and he is an international authority on the chemistry, production and manufacture of Portland cement. He is in the active management of the Sandusky Portland Cement Company, which operates five immense plants and is the largest independent manufacturer of Portland cement in the United States. Its "Medusa" brand of gray Portland cement is regarded in the Eastern States as the very highest grade of Portland. Mr. Newberry's experiments have been conducted for the company, and it has had sufficient confidence in the results obtained to build and equip a special factory in eastern Pennsylvania for the exclusive manufacture of white Portland cement. It is reported that this product will soon be placed on the California market by the Western representative of the manufacturers.

* * *

A Concrete Door

A reinforced concrete door has been designed and patented and will be placed on the market. This door, it is claimed, will have a maximum of strength combined with a minimum of weight, this being accomplished by making the interior of the door, where the panels of a wood door are placed, thin and the edges thicker to withstand the wear and tear of opening and shutting. Both the hinge and the lock edges are protected by a curious weaving of wire "fingers," and the lock and latch are made secure by a combination of wire and concrete.

Transverse metal strips are used to reinforce the top and bottom, and the hinge edge is reinforced by a flat vertical strip. Threaded nuts are introduced behind this reinforced strip, and screws are inserted before the concrete is poured. After the door is welded, these screws are withdrawn, thus leaving openings for the hinge strips.

The body of the door is made of finely woven wire mesh suited in size and strength to the purpose for which the door is to be used. Over this the concrete is poured, and the door when molded and dried can be smoothed off like wood. The doors can be stained any color desired.

* * *

In the manufacture of concrete building blocks the two most important items are, first, to tamp the material thoroughly at the time of molding, so as to make the cement an aggregate mixture as dense as possible; and, secondly, to thoroughly cure every block. Simply to lay blocks on the yard and to intermittingly sprinkle them with water cannot be called adequate curing. The crystallization of every cement mixture is a chemical action, and, like most chemical processes, is considerably assisted by the presence of uniform heat, such as can be secured by creating an artifical atmosphere by the use of exhaust steam or tepid water.

The Architect

By F. W. FITZPATRICK, Consulting Engineer

THE writer of a recent magazine article, entitled "The Profession of Architecture," glowingly describes the fat fees taken in by that profession, its high standing in the community, the great erudition of its practitioners, etc. The entire article is virtually a most fragrant and highly colored bouquet, tied up in pink and baby-blue ribbon, and handed over the footlights by—I imagine him to be—an admiring and enthusiastic layman. Many such articles that I have seen of late in magazines and newspapers, aided and abetted by lectures and technical school prospectuses, tend to create an entirely wrong idea of the profession, its emoluments, its duties and its status.

Now, dear reader, do you wish to come behind the scenes and peek at architecture as she really is, without the glare of calciums and blare of the bass-drum? A glimpse behind the scenes, you know, often disillusionizes the glimpser, but it makes him more critical, he expects more thereafter, and, perhaps, that in turn may lead up to better acting on the part of the actors, who, after all, gauge their work up or down to the standard established by that criticism.

In the first place, who are the architects, anyway? Who or what gives us that title, and when and where did we get it?

What follows will indirectly but fully answer the query. It makes a good opening or text to begin with, so we will let it stand.

When I was a boy, an architect was a somebody—a superior person. There was much mystery about his work; his word was law; the client was a small part of the performance. The architect designed his building and made a set of plans; his students, or "clarks," made a couple of copies, wonderfully and painfully rendered. He wrote a treatise called a specification, and other "clarks" wrote off a couple of copies therefrom. Then he visited the building in solemn state once a week or so and collected his five per cent fee. He bothered not his head about the plumbing, the heating or any of the other few and primitive accessories that were then. Those things were attended to by specialists with whom he had nothing to do. He ranked with the judge, the leading lawyer, the eminent physician—several pegs higher in the social rack than the merely successful merchant or broker, and there was a bottomless chasm between him and the lowly builder or contractor.

He had studied and worked in the successive stages of apprentice, student, "clark" and assistant in some office for a dozen or more years, and had probably traveled some, perhaps even to the Far East. There were no more preliminary fastings and prayers for him to go through in those times than there are now before his "admission" to the full honors of the craft. Ours has ever been an open profession—wide open. When he got ready he went in, and that is all there was about it. And so it is today, only more so, for then few men entered the ranks or received many commissions who were not pretty well trained. It was not so popular a profession as it has grown to be of late. Yes, sometimes he competed for his work—it has always been the fashion—but he did so in a dignified way. But of competitions more anon.

Later his duties became more complex. He took in the plumbing and other frills, his plans comprehended all there was about a building. Competition among builders grew more keen. He had to have more plans and specifications. Inventions of copying processes and the typewriter came to his aid, and he turned out copies of his work by the dozen—yes, by the hundred. He became more of an executive and less of an artist. The era of steel construction came in. At first he worked with an engineer; then he absorbed the latter and employed him. So many things were involved in architecture that he had to be satisfied with looking after the merest generalities, leaving all the details to his "subs." Later he actually forgot all about detail. Many even of our leading architects today could not design a cow-barn half decently, and as for the art of drawing, many could not earn a dollar a day at it.

Your architect has become a business man, pure and simple. Competition in his line has become, as in all else not yet in the trust, so very keen that there is no fun in it. He has to belong to boards of trade, coax the ward and other bosses, run with the machine, promote enterprises that need the construction of big buildings, be diplomatic and politic, work his friends and his wife's relatives and pull the social strings for all they are worth, and get his commissions by any means that a rather elastic, really business conscience may deem legitimate other than upon his merit as a designer, a skilled worker in the mistress, the grandest of all the fine arts.

He is and perforce, essentially a business man. I repeat, architecture is not any longer an art or even a profession; it is a business and is handled upon strictly commercial lines.

Of course, there are still master minds, comparatively great artists in our ranks, and some of them are leading architects. A very few are the "whole thing" in their offices and practice under their own names and alone, but they are so few as not to affect the proposition in the least that the really successful architect is a business man. There are many happy combinations of an artist and a commercial-social-expert, strong firms and able, but you will find, in nine cases out of ten, that the business end is the strong one, the senior partner the leading man—the "whole thing," indeed; the other is little better than a chief technical assistant or office man.

But by far the greater number of successful architects employ all their talent. These architects are attracted to the profession from other lines; they were contractors, material men, etc. Some were draftsmen, true, but unfit for the work, incapable of earning a decent living by it, so they "opened an office" of their own.

You see, the two qualifications—that of being artistic and that of being a shrewd business man—are seldom if ever found in the same man. If they are there at all, one or the other is bound to be the more developed and finally extinguish the other. In an office, among a lot of draftsmen, you will find one who is enthusiastic over art; he studies a lot, applies himself, is pushed ahead, for he is valuable and gets as high as $10 a day. Another realizes he has not the talents of the first but is shrewd enough to keep his eye on the main chance. He wastes no time studying, not he; he gets out among the people, hob-nobs with the contractors, is particularly attentive to the clients of his employer and impresses upon them how very important his services are upon their work. He figures out that with his meager talents he can not become more than a "tracer" or a "detail man" or a superintendent in that office, but he realizes that if he gets a good "job" to start in on he can become his own master and hire just as good talent as that of his confrere or that very same artistic man. So he wiggles around some clients of the office where he is at work, or, if over-conscientious, gets his prey on the outside, makes a lot of plans with the assistance of his talented office-mates during their spare time, pays the latter or not, as the case may be, and launches out into practice, the embryo of a successful architect!

Some states have some form or other of license for architects, but it is a farce at best. With us it is not as in law or medicine, or even with dentists, drug clerks or parsons. All these go through some form of examination or receive some sort of permission from some one in authority to ply their "calling." With us, as soon as a man can afford $3 or more for a sign with the magic word "Architect" upon it, he is thenceforth and forever an architect in fact; he has "called" himself, as it were, and is as much entitled to that honored title as was a Richardson, a Hunt, or an Atwood—in the eyes of the law and of the dear, discriminating public. Any one of you, my readers, male or female, regardless of color or previous conditions of servitude, may put up such a sign, and no one, in most of our states, may say him "nay." In the other states, $10 or $20 will change that "nay" to a lengthy and beautifully gotten up parchment saying "yea" in old English script, which parchment, for $2 more, may be framed and conspicuously hung up in the office to catch still others of the eternally gullible.

You may ask "What becomes of the skilled designer, the artistic one? Is he not bound to come out on top finally?" No, gentle reader, he will not come out on top. He early realizes the futility of bucking against his shrewd brother, so he works for him. He becomes a sort of machine. Disgusted with what he thinks the injustice of the world and, blessed with a highly strung, nervous temperament, some of him drink themselves into early graves or—smoke cigarettes. Others drift into other and perhaps better-paid lines of design—decorators, furniture, etc., and still others drift into heaven only knows what. I have met good, high-class draftsmen herding cattle, stoking engines and collecting bills. Every twenty years or so, when our periodical hard times come upon us, they scatter, do these clever fellows, to the four corners of the globe, and you can never gather them all back into the fold after the storm.

So, then, the average successful practitioner is, let us call him, an employer of skilled labor, a sort of middleman. Now, for a professional man, is that not a strangely anomalous condition? What would you think of the eminent physician and of the learned legal luminary if they were introduced to you and stayed with you and "jollied" you to the point of your employing them as your professional advisers, only to find, when you were sick, that the former sent around an assistant to diagnose your case, another perhaps verdant youth to practice upon you, and a third adolescent to get the data necessary for the death certificate; or of the legal luminary, should you get into trouble, if he sent you a young assistant to put the facts in the case together ready for a second to prepare a brief for a third youth to plead before the jury in the name of and for the great man who was, meanwhile, chasing other prospective clients and growling at the aforementioned assistants for putting so very much time on your case?

Is it an overdrawn picture? Well, there is your average architect. It may indeed fit some of the pre-eminently successful ones. I grant you it is not flattering or attractive.

The writer whose article really inspired this perhaps seemingly acrid whatever you may call it, says, naming two prominent societies of architects, that "they have done much to make the position of an architect higher today than it ever was." He goes on to say that we are actuated by loftier motives and a nobler spirit than ever before and are striving to place our calling in an unassailable position. As a matter of fact, those societies have done much to bring the architects a bit nearer each other, to impart to them some *esprit de corps* and to make the practice of the profession somewhat more uniform in appearance, at least; but I fear it is too late in the game. Perhaps am I a false prophet, and perhaps am I only a kawing, croaking bird, "shrilly squeaking false alarums;" still, methinks there is the handwriting upon the wall! It seems very plain to me. Heaven grant I may not be a Daniel.

I am well content to be only one of Belshazzar's Chaldean interpreters reading it not aright. But to me it spells in big letters that architecture as an independent profession is doomed!

That spirit of commercialism that we have done so little to check, that we are powerless to check, and that so many of us have actually fostered, will be our undoing. Centralization is the order of the day. The carpenter and the stone mason of old have made way for the "general contractor," and the latter, passing through his chrysalid state, has been merged into the colossal "building company," with millions of capital, splendid executive talent and unequaled influence. When a big building is contemplated it is getting to be fashionable, policy and economy to give it to such a company to execute. The architect is a very secondary consideration, and though he gets a fat fee he is a very small fry about that building. The company uses his design—that is a matter of form—and builds it well, but to suit itself, for it deals directly with the owner. The architect is no longer the arbiter and supreme judge of all about that building. There have been cases where such a company actually named the architect, who was then appointed by the client. It is only a step more to his being employed directly by such a company. That has not been done outright simply because it would antagonize all the other architects, and they still have some strength.

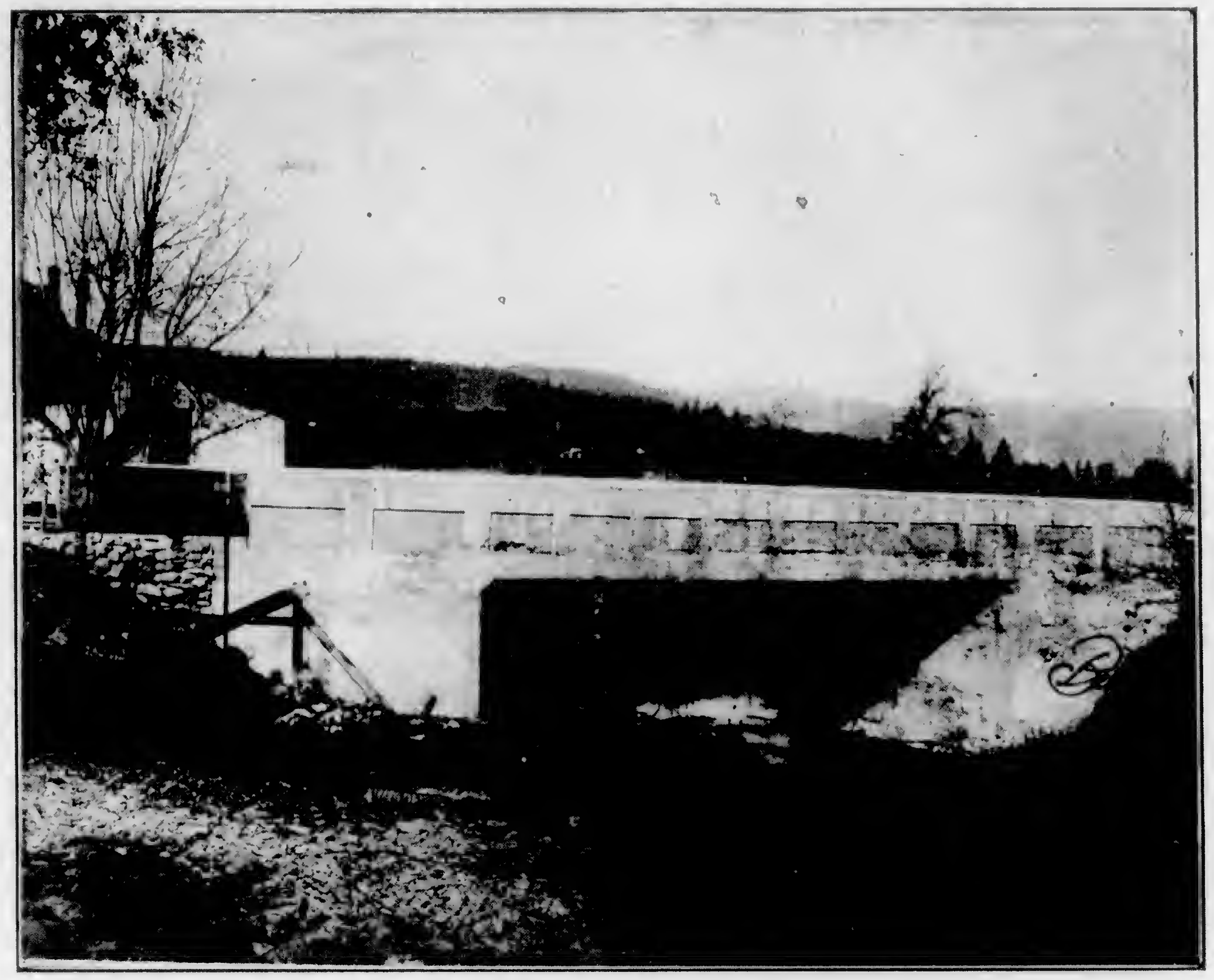
But, mark my word, some day, and perhaps one not so very far off, the next step will be boldly taken. The architect will be relegated to the past. Those companies will employ their own designers, the architect will be lost in the shuffle. You will state how much money you wish to invest, and those different companies—if they are still uncombined—will tell you how much building they will give you. They will submit designs made by their own employes, and the resulting structures will be just as artistic and well built as those of today. There will be as high a premium upon talent and skill as now, perhaps higher, but the possessors thereof will have changed hands; they will bow unto the company as their chief where they salaamed before to the architects. The latter, as middlemen, will pass away, or, at best, will be but memories—battered specimens of a once proud race.

Could anything have been done, or can anything be done now to prevent this impending dissolution? Is it not simply the steady march of evolution, progress? Have not other professions and trades passed away to make place for newer, better means of accomplishing certain ends? In how much or what is the profession to blame, if blame there be, for bringing about this condition? Go ask the American Institute, wiser men, social doctors; they may answer these and all other queries you may propound. I am but the young assistant come before you to diagnose the case, not to cure the disease nor to prepare the death certificate. I have told you what stage the malady had reached, describing it clearly, without the embroidery of technical terms or seeking to minimize its seriousness.

Go, get it cured, or let it run its course. *Vale!*

Utility

There was a man in Henderson,
So very tall and slenderson;
  A human rail,
  Who used a nail
To fasten his suspenderson.
—Chicago Tribune.



Upstream Elevation of Rincon Creek Bridge

The Rincon Creek Bridge

THE problem of constructing and maintaining county bridges across the streams intersecting the highways of the State is becoming more serious for the Boards of Supervisors each year. The development of the State is necessarily accompanied by increased travel over its highways and in most cases this travel is of a heavier character than existed a few years ago. It demands the improvement of roads that in the past have been called upon to support a very limited traffic and the opening of new means of communication with heretofore almost inaccessible districts.

The increased weight and volume of the traffic, together with the deteriorating influences of the elements on many of our County bridges make the expense of their maintenance an enormous burden to be borne annually by the taxpayer.

The bridge fund of each tax levy is so largely used up in repair and partial renewal of existing bridges, that but little (if anything) is left from which to build the new bridges which the taxpayers of every County in the State are anxiously and justly demanding of their Supervisors. And each year as these bridges grow older and weaker, the item of expense for repair work increases and eats farther and farther into the bridge funds. This condition has forced the demand for permanent county bridges to the front as one of the crying needs of the times. A bridge of moderate cost that when once completed, if properly constructed, will make no further inroads on the bridge funds of the county, instead of becoming a leech on these funds, demanding more money every year for repairs, paint, planking and the many other things that the old and now inferior forms of bridge construction require; such a bridge, in fact, as will

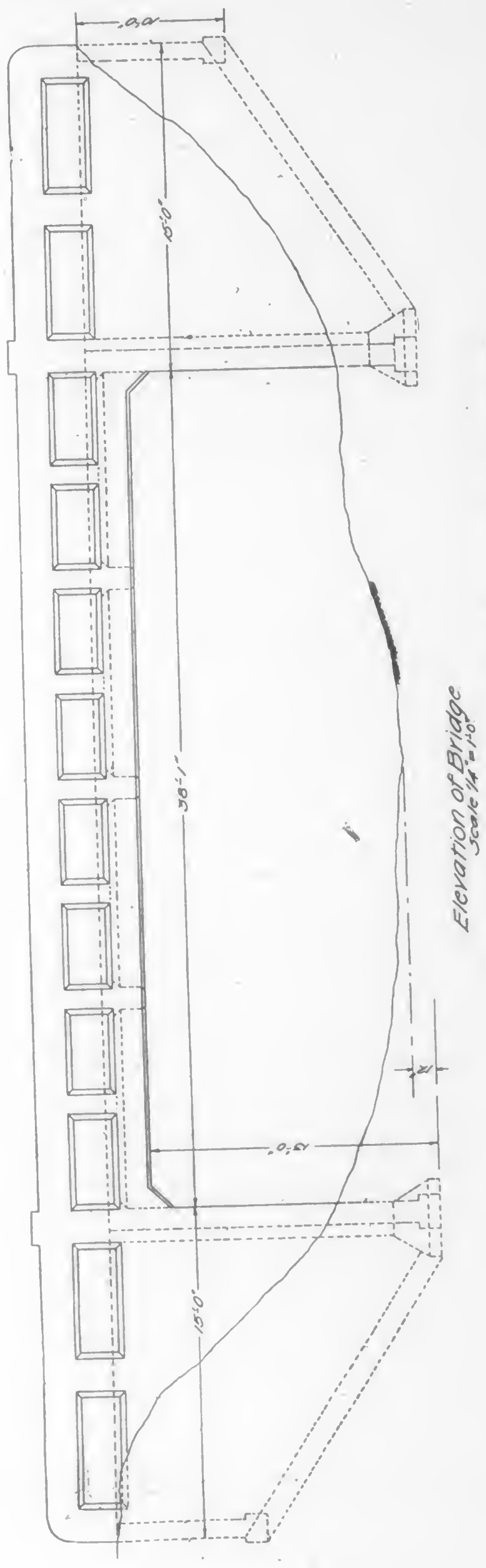
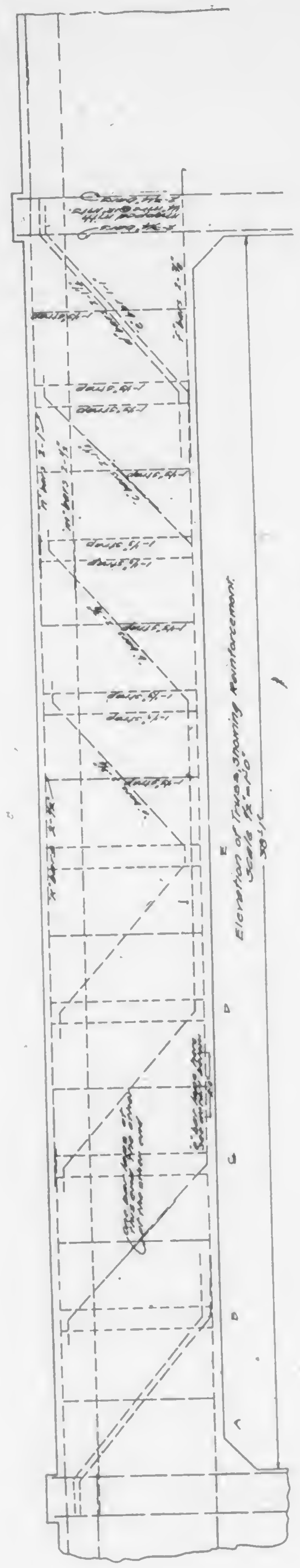

Elevation of Bridge
Scale 1/4"=1'0"
8'0"
38'1"
13'0"

Fig. 1. Rincon Creek Bridge Showing Elevation, Profile of Ground and Foundations



Elevation of Truss, Showing Reinforcement

The Rincon Creek Bridge, Showing Roadway

Downstream Elevation of Rincon Creek Bridge

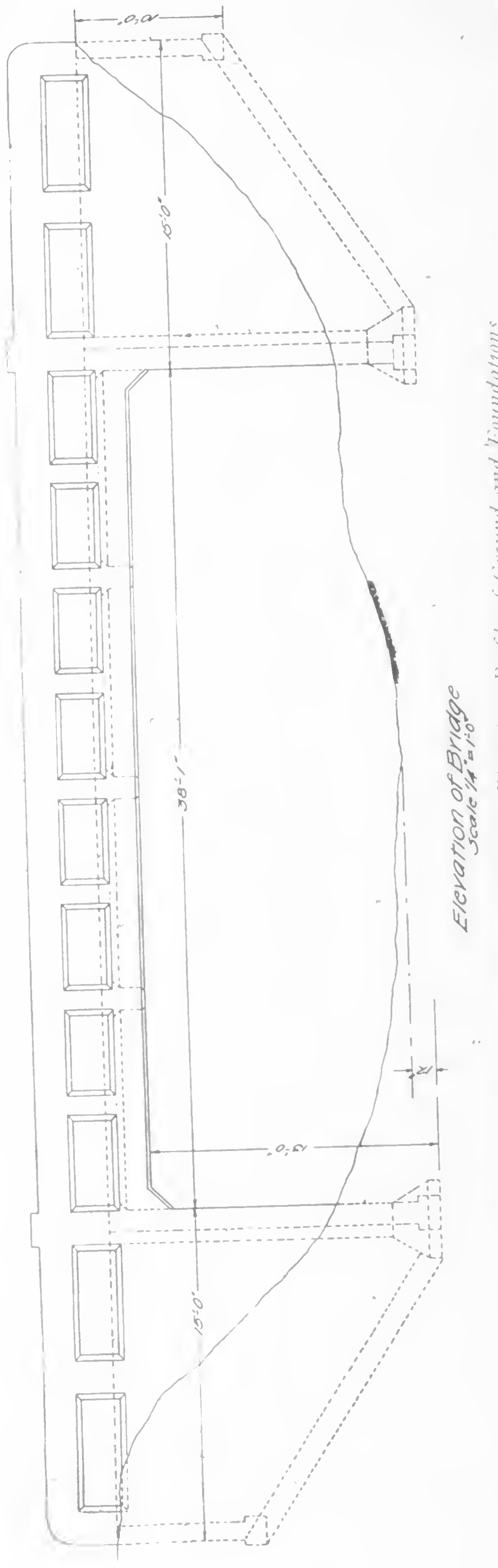
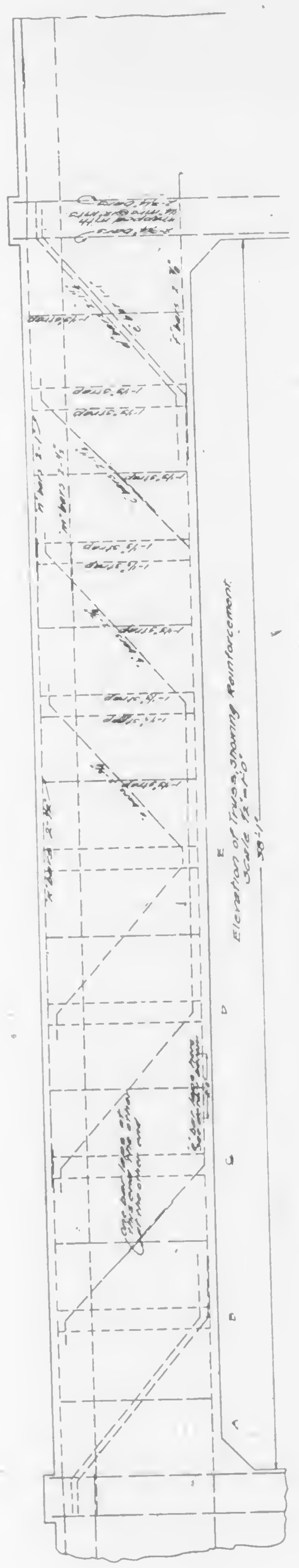
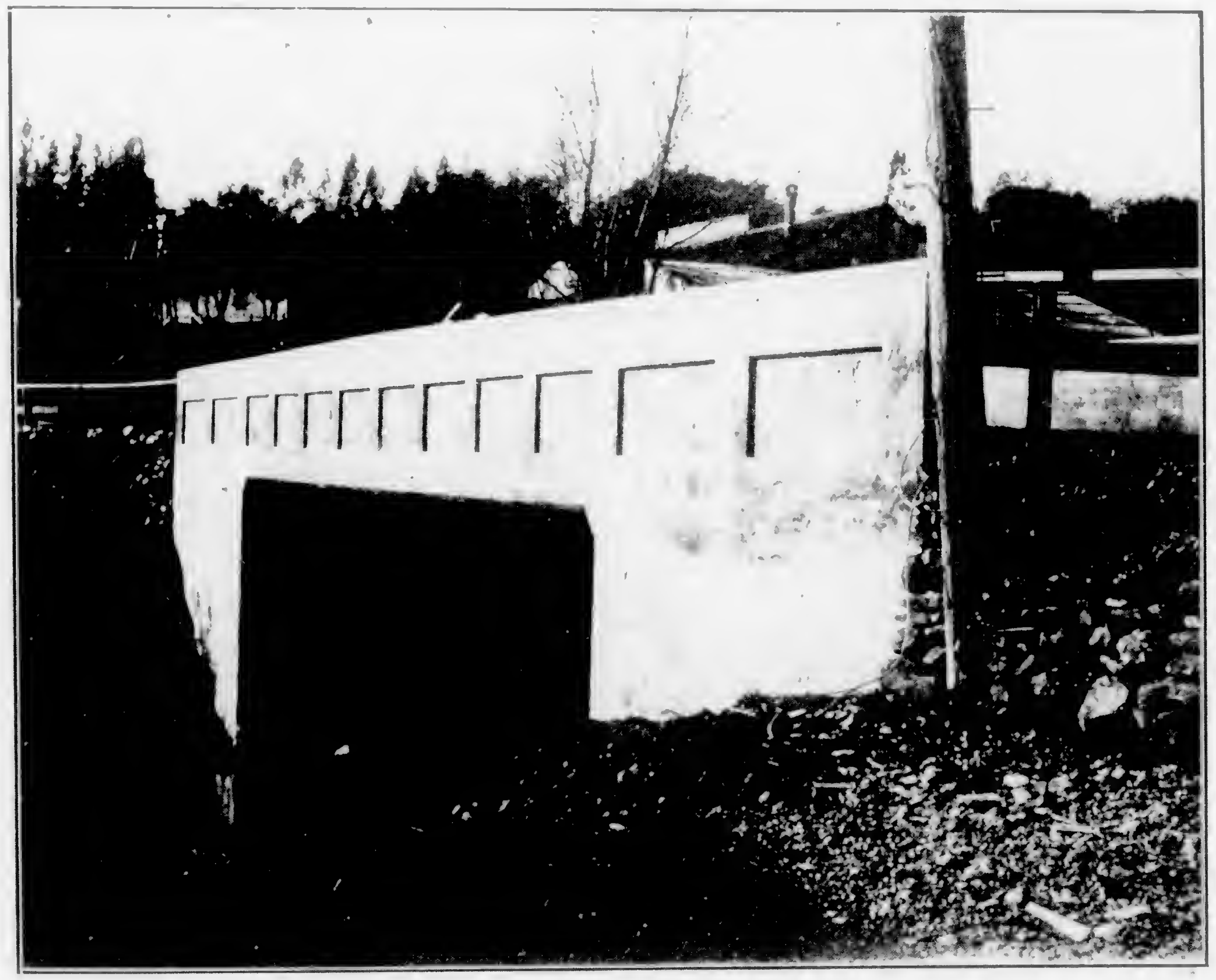

Elevation of Bridge
Scale 1/4"=1'-0"
10'-0"
38'-1"
15'-0"
12'-0"
12'

Fig. 1. Rincon Creek Bridge Showing Elevation, Profile of Ground and Foundations

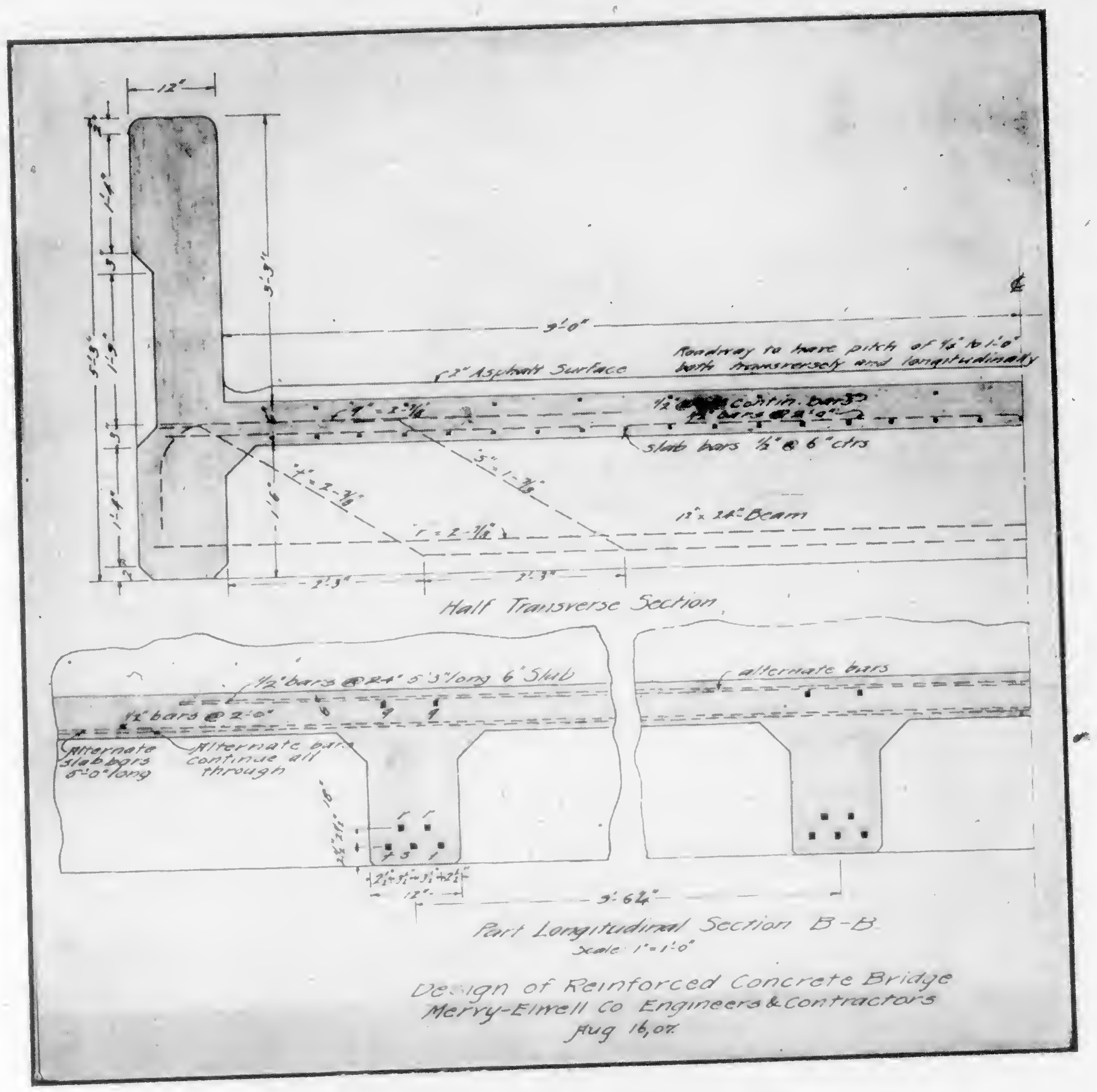

Elevation of Truss showing Reinforcement
Scale 1/2"=1'-0"
38'-1"

Elevation of Truss, Showing Reinforcement

The Rincon Creek Bridge, Showing Roadway



Downstream Elevation of Rincon Creek Bridge

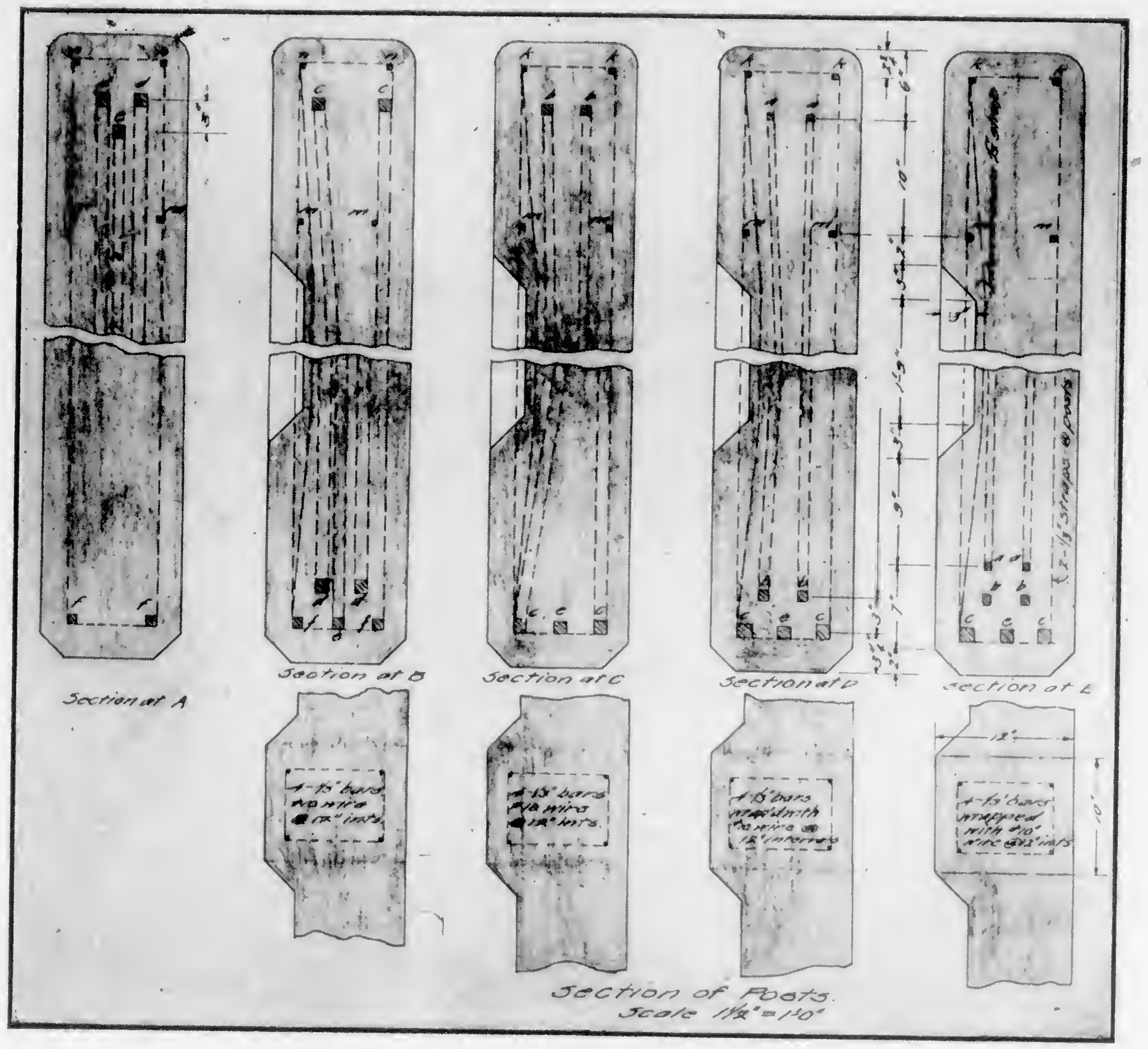

12"
3'-3"
5'-3"
9'-0"
2" Asphalt Surface
Roadway to have pitch of ¼" to 1'-0" both transversely and longitudinally
½" contin. bars
slab bars ½" @ 6" ctrs
12" x 24" Beam
2'-3"
2'-3"
Half Transverse Section
½" bars @ 24" 5'3" long 6" Slab
½" bars @ 2'-0"
Alternate slab bars 5'-0" long
Alternate bars continue all through
alternate bars
12"
5'-6¼"
Part Longitudinal Section B-B
Scale 1"=1'-0"
Design of Reinforced Concrete Bridge
Mervy-Elwell Co Engineers & Contractors
Aug 16, 07.

Structural Details Showing Reinforcement

relieve the county of further expense after completion and leave the bridge funds available for the much needed new bridges.

In the search for a structure which will meet these conditions, there are found three types which can be counted upon to yield the desired results. They are stone, concrete and reinforced concrete. A careful study of these materials concentrates the attention on reinforced concrete, because of its moderate cost and greater possibilities. Before the physical characteristics of reinforced concrete were understood, spans of any length that could be constructed in masonry were of the arch type. The experiences and investigations of the past few years, however, clearly demonstrate that openings can be spanned and bridges can be built of concrete with flat arches, the floors and abutments being at absolute right angles to each other and any strength desired can be given to this plain and simple form known as the flat arch or floor slab type, provided the beams, girders and slabs be properly made of concrete that has been reinforced with a right quantity and quality of steel rods, bars or fabric properly placed. The strength depending on the design, the kind of reinforcing used, and the care and competence of the inspector or superintendent of the job.

Figure 1 shows elevation and sectional detail of such a reinforced concrete bridge recently built across Rincon Creek, on a main county road about two miles from Santa Rosa, by the Supervisors of Sonoma county. The structure has a clear span of 38 feet 1 inch, with an 18-foot clear roadway,

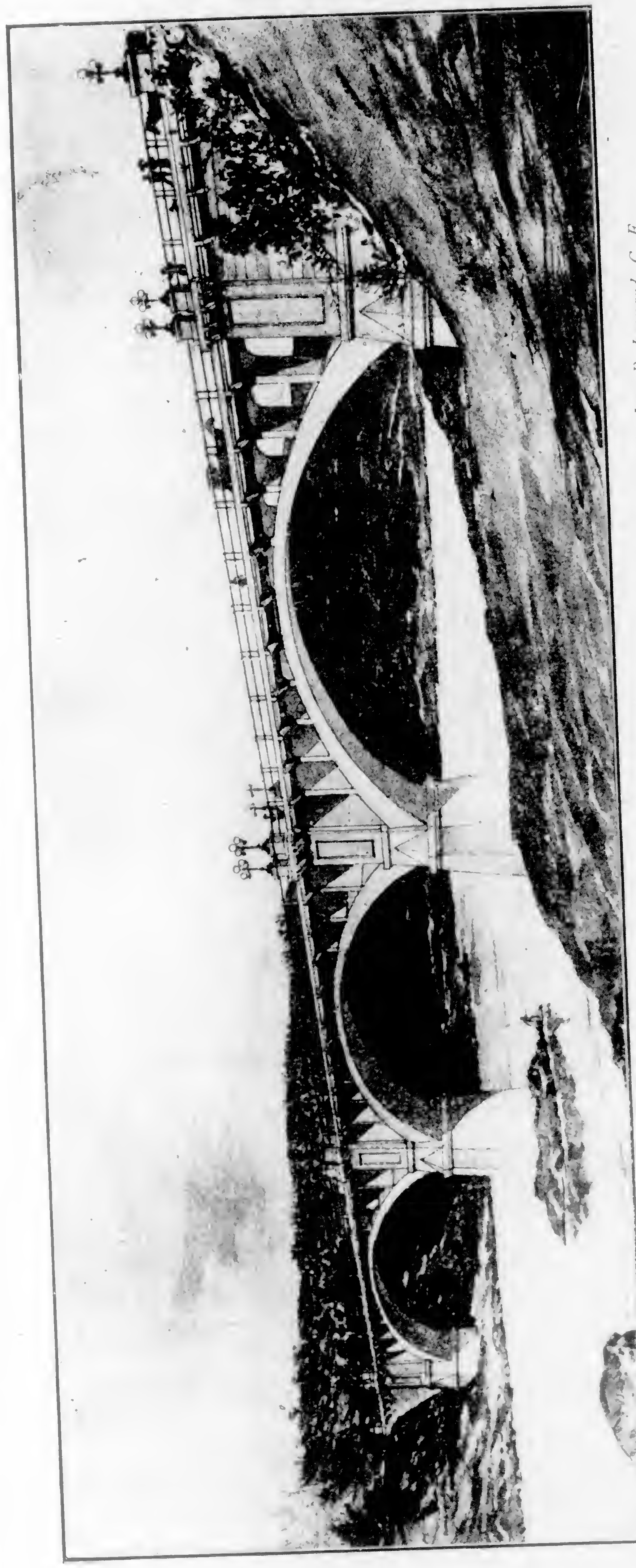

Section at A
Section at B
Section at C
Section at D
Section at E
Section of Posts
Scale 1½"=1'0"

Structural Details Showing Reinforcement

The structure consists of a system of slabs and beams, which are in turn supported by girders extending parallel with the axis of the bridge, one on each side of the roadway. The whole construction consists of concrete reinforced with corrugated steel bars. The bridge is subjected to a very heavy traffic, loads of four to six tons (paving blocks) per wagon crossing many times a day. The concrete was fabricated of 1 part of domestic cement and 6 parts of aggregates, sand and rock. The aggregates being of a very excellent quality. Work was commenced in the fore part of August and the structure was opened for travel about October 15th. When the forms were removed from under the span, there was no settlement that could be detected with an engineer's leveling instrument.

The strength of concrete does not diminish, but increases year after year for many years, and if the work and the material are right, the children's children's children of the present generation will not live to see deterioration begin. Steel reinforcement covered by concrete is rust and injury proof. Concrete erected during the Roman Invasion of England is still in good condition and speaks for the life of good concrete.

No plan or design is good unless faithfully and correctly executed, and no structure sound unless erected of sound material. The structure shown was designed and executed by the Mervy-Elwell Company, of San Francisco, to whom we are indebted for the above description.



Design Submitted for Reinforced Concrete Bridge (3 Spans of 200 Feet Each) Across Feather River by Jno. B. Leonard, C. E.

Among the Architects

American Institute of Architects

(ORGANIZED 1857)

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Steel Bridge for Foot of Market Street

To relieve the congestion at the foot of Market street, San Francisco, Architects Meyers & Ward have made plans for a steel viaduct which has been submitted to the supervisors for their approval by the Merchants' Association.

The design provides for a foot bridge extending from the second story of the Ferry building across East street on the south and across Sacramento street on the north. Steps are provided by which pedestrians may ascend the bridge at either East or Sacramento streets. In its general contour the bridge follows the loop of the United Railroads and will act as a shelter in winter time. The plans have been arranged so as to provide for a complete span across East and Sacramento streets without supports on either of these thoroughfares. The pillars are of ornamental design and, according to the plans, are to be placed at the intersection of the streets.

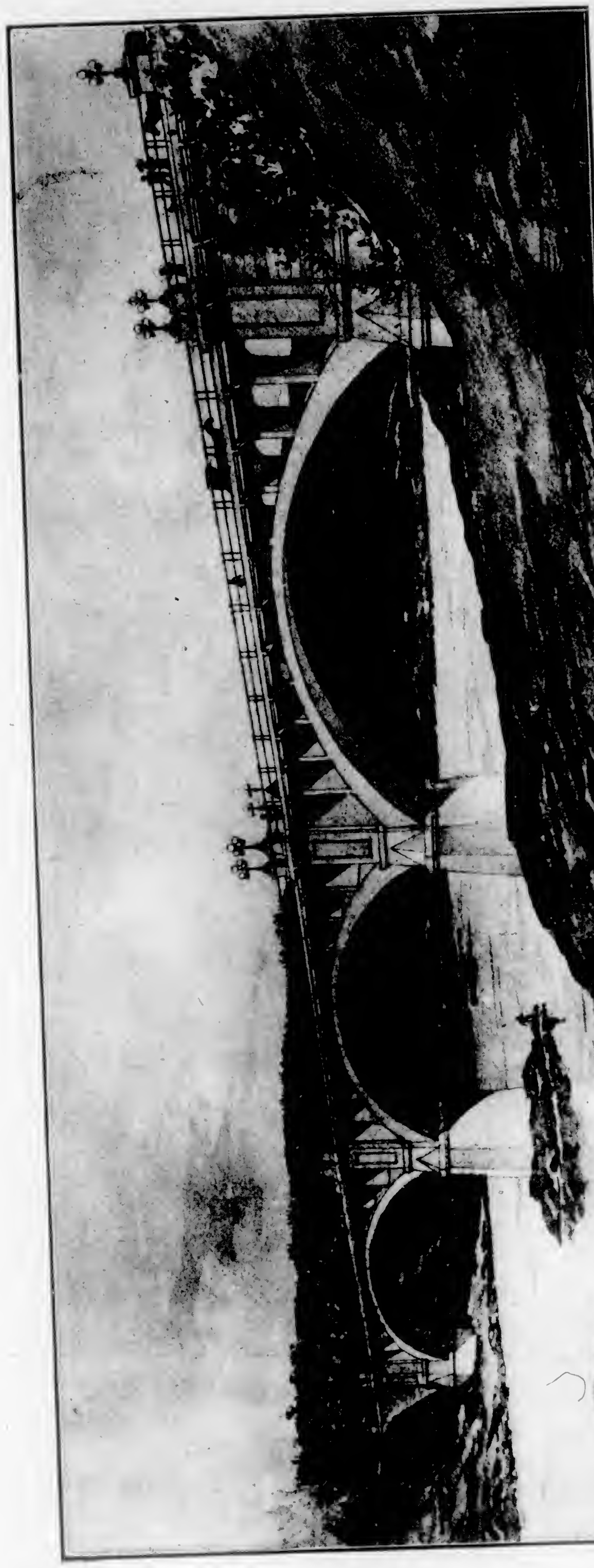
The bridge is not intended for the convenience of passengers on the cars so much as for the pedestrians who are compelled to cross East street at the foot of Market. The estimated cost of the bridge is $40,000.

Close San Francisco Office

L. E. Stanhope, who for a while was in charge of the San Francisco office of Holabird & Roche, recently discontinued, is now permanently located at 184 La Salle street, Chicago, where he will be pleased to see his friends and former clients. Mr. Stanhope's specialties are architecture and civil engineering and expert counselor on building ordinances. In returning East with his family Mr. Stanhope enjoyed a visit to Seattle, Victoria, Vancouver and St. Paul. While in Chicago Mr. Stanhope closed a deal with a former client, whereby he is to remodel one of the big hotels in the Windy City.

New Carnegie Libraries

Andrew Carnegie has donated $9000 for a library to be erected in Lodi and $6000 for a similar building in Lincoln. The latter place is the home of Gladding, McBean & Co., who will supply the brick and terra cotta for the building.



Design Submitted for Reinforced Concrete Bridge (3 Spans of 200 Feet Each) Across Feather River by Jno. B. Leonard, C. E.

Among the Architects

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Steel Bridge for Foot of Market Street

To relieve the congestion at the foot of Market street, San Francisco, Architects Meyers & Ward have made plans for a steel viaduct which has been submitted to the supervisors for their approval by the Merchants' Association.

The design provides for a foot bridge extending from the second story of the Ferry building across East street on the south and across Sacramento street on the north. Steps are provided by which pedestrians may ascend the bridge at either East or Sacramento streets. In its general contour the bridge follows the loop of the United Railroads and will act as a shelter in winter time. The plans have been arranged so as to provide for a complete span across East and Sacramento streets without supports on either of these thoroughfares. The pillars are of ornamental design and, according to the plans, are to be placed at the intersection of the streets.

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C. E. Roesch. Active Worker in the San Francisco Architectural Club

The San Francisco Architectural Club

By C. E. ROESCH

AN EXCELLENT illustration of the desire for knowledge, displayed by the younger men in the architectural profession, is shown by the Syllabus, or year book, of the San Francisco Architectural club, which has just come from the press. A series of highly entertaining and instructive lectures has been arranged for, as will be seen by the following extracts from the calendar:

Lecture on "Gothic Architecture," illustrated with slides, by Arthur Brown, Jr.

Most every one, in the profession, knows what this means, for Mr. Brown has spent considerable time abroad and after graduating from 'Ecole des Beaus Arts, with such high honors, having taken all prizes, he devoted much time visiting unfrequented spots in England and was able to get photographs of subjects hitherto unpublished. This lecture is programmed for some time in February.

On December 11th Architect W. Gardin Mitchell gave a most entertaining talk on "Spanish Architecture," illustrated with photographs and drawings, made by Mr. Mitchell, of that very interesting country, close at hand, Mexico.

In April an intellectual feast is to be given, in a series of talks on his "Experiences Abroad," by Herman Scheffauer. Mr. Sheffauer was a member of this club in its struggling days, and was devoting his time to the elementary study of architecture. But the practical side did not find a harmonious chord in his more romantic nature, however, and he soon gave it up to the study of the literature of the subject and, to do this, spent the past four years on the continent, visiting the more unfrequented spots of that fountain of knowledge. He has now returned, having attained recognition in the world of letters, his efforts being sought by several of our standard publications. His powers of description are highly developed and his articles, while of excellent historic value, carry a vain of charming descriptive matter which makes them unusually entertaining. As a lecturer, he has a charm of expression and, with his ability as a word painter, gives one a delightful evening.

Among the more, or less, technical papers we will mention the following:

January 15, 1908, "Terra Cotta and Tile," Athol McBean.

February 12, 1908, "Paints, Varnishing and Painting," H. T. James.

March 11, 1908, "Cement and Cement Tests," Wm. B. Gester.

May 13, 1908, "Hardware," C. E. Vanpel.

June 10, 1908, "Lighting Fixtures," C. E. Roesch.

A new feature, introduced with this season's work, is what is known as "Club Discussions."

A record of the salient points brought out in these debates is kept in book form with which is included the drawings submitted to further illustrate the discussions.

Several exhibits are to be held during the year terminating with the Annual Exhibit on August 19th, 20th, 21st and 22d.

On February 19th, the work of the Life Class is to be on exhibition, open to invited guests.

The evening of April 15th is to be given over to the "Steel Class" and it will be devoted to a general review of the work with blue prints of problems, etc.

On June 17th, the work brought out by the club discussions, is to be exhibited. On all these dates visitors are welcome.

The usual club competitions will be held during the year and some of the various manufacturing interests have offered cash prizes for competitions in materials in which they are interested.

The classes will continue their work throughout the year meeting on the following nights:

Steel, every Thursday evening, 8 p. m.

Water color, every Sunday morning, 9 a. m.

Life Class, every Tuesday evening, 8 p. m.

A class in design is being formed and it is planned to get the assistance of a graduate of 'Ecole des Beaux Arts, Paris, to render criticism.

It will be seen from this that the club is unusually active in its departments of instruction, and as this was the prime object in its organization, its present development is very gratifying and it should have the fullest encouragement of the older men of the profession.

Oakland's New City Hall

Oakland architects are submitting plans for a new city hall. No definite type of building has been decided on, and the drawings submitted are being used as guides to prepare a bond issue. These plans are being taken up by the city hall committee of the council in conjunction with the mayor and the board of public works.

Secretary Wilson Banqueted

James A. Wilson, the popular secretary of the San Francisco Builders' Exchange, was the guest of honor at a banquet given December 21st, at the St. Francis Hotel by members of that association and a number of friends. The banquet was served in the white and gold room, at a long table decorated with flags and flowers.

S. H. Kent, president of the Exchange, was toastmaster and kept the speechmaking going at a lively rate. Wilson lately returned from a long trip abroad, and the festivities were offered as a welcome home from foreign lands. Between the speechmaking there was plenty of music, both vocal and instrumental.

Post Office building for Santa Cruz

Santa Cruz is to have a handsome new Post Office building. The Board of Trade of the Surf City is in receipt of a letter from Washington stating that a bill has been sent to Congress providing for the erection of a public building at Water and Front streets at an expense of $124,000. As soon as the bill is passed plans will be drawn under the provisions of the Tarsney Act and supervised by the government architect, John Knox Taylor.

Architects' Announcement

C. A. Edelsvard and E. M. Sankey, A. I. A., architects, have formed a partnership and have established offices at Nos. 610 and 611 People's Savings Bank building, corner Second avenue and Pike street, Seattle.

Mr. Sankey is known in the Northwest through his connection with buildings in Laurelhurst and Interlaken Parks, Seattle, and at various other points in the State of Washington.

Mr. Edvelsvard recently arrived from New York City, being well known on the Atlantic Seaboard, where he has designed and erected the following, among other numerous buildings:

Architect for Public School No 42, Greater New York.

Seven-story reinforced concrete building for H. Mason, Blicker street.

Six-story building for E. Van Ness Heermance, on West Twenty-seventh street, New York City.

Plymouth Hall, Smith College, Northampton, Mass.

Two dormitories for Indiana University, Bloomington, Indiana.

Railroad stations at Manchester, Petersburg, Dinwiddie Courthouse and other points in Virginia and North Carolina for the Richmond, Petersburg and North Carolina Railroad.

Carnegie Library, San Pedro, California.

Architect for Italy, Spain and Cuba during the World's Columbian Exposition at Chicago in 1903.

Mr. Edelsvard received a classical architectural education in Europe and gave special attention to landscape architecture as practiced on the Continent, especially in England and Italy.

Dissolved Partnership

It is reported that the architectural firm of Meyer & O'Brien, architects for the Humboldt Bank building, has dissolved partnership, Mr. Fred Meyer associating himself with Mr. A. R. Johnson, formerly head draughtsman for the firm and recently of Reno, Nevada. Smith O'Brien will engage in the profession independently and will have offices on the eighth floor of the Humboldt building. Meyer & Johnson will also be located in the Humboldt building.

Architectural Club

The San Francisco Architectural Club has elected the following officers for the ensuing year: President, F. A. Farnkopf; vice-president, Lacy Worswick; secretary, Mr. Betts; treasurer, L. P. Antony; board of directors, 1908-09, A. La Franchi, Norman Sexton and Charles Sawver.

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Vol. XI. JANUARY, 1908 No. 3

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BETTER BUILDINGS DEMANDED

The many accidents and actual collapses of buildings while under construction have given force to the warning of such conservative bodies as the International Society of Building Inspectors, that has long advocated more stringent regulations of experimental construction in our cities. New York's Building Code, now being rewritten, calls for a much higher class of construction in all grades of buildings than the old one and it throws such safeguards about the use of reinforced concrete as to make that material much less attractive to the speculative builder. Seattle has just passed a new building ordinance permitting standard steel construction to go up to sixteen stories but limiting reinforced concrete buildings to ten stories and it, too, makes many restrictions as to the use of reinforced concrete. Minneapolis has gone a step farther and has just passed an amendment to its building laws compelling every owner who builds a reinforced concrete building to have a specially licensed building superintendent constantly in charge of that work, one directly responsible to the city for the efficiency of his superintendence. Little by little the authorities are awakening to the fact that concrete is a most excellent thing when properly handled but the most dangerous of all building materials if the slightest imperfection is allowed in it. Fatal collapses of buildings have grown altogether too common. A radical reform is imperative and is in progress. A year ago—one of our important building journals exclaimed: "The grey of our concrete structures is already too much stained with blood. Shall we allow that stain to spread and grow still darker?" Evidently our city authorities have determined to try and prevent the spread of that stain.

THE NATION'S EXTRAVAGANCES

The Governors of the several States have been invited by President Roosevelt to meet in Washington in May to discuss the nation's wastes and extravagances, her criminal prodigality with what have seemed to be inexhaustible natural resources that are fast disappearing, and to devise means of lessening this appalling destruction. This is a splendid and most timely move on the part of the President.

While these gentlemen are assembled it is planned by Architect Fitzpatrick, the executive of the International Society of Building Commissioners, to submit for their consideration some facts and figures anent the fire waste that it is believed will impel them to take the initiative in proposing legislation in their several States looking to the betterment of building construction and the reduction of the fire tax. That authority points out that of all our wastefulness fire is one of the very costliest and the only one in which human lives are also sacrificed. Over 6000 lives have been destroyed by fire in a year's time. The tax in actual combustion of buildings, in the maintenance of fire departments, and in premiums to insurance companies in the hope of recouping some of the damage, amounts to over half a billion dollars a year. A sum that is just barely equalled by the cost of new buildings erected in our most prosperous year. No other nation on earth permits of any such waste. Fire has eaten up in twenty-five years' time over $3,500,000,000 worth of property—a sum that exceeds the highest point ever reached by the United States debt!

In Europe fires seldom extend beyond the buildings in which they originate; in this country, whole city blocks of buildings and even entire sections of cities are wiped out in one conflagration. Boston will average $1,500,000 in fire a year, while the average of five European cities of equal size is but a trifle over $150,000. Our fire tax here, the cost of combustion only, exclusive of the cost of fire departments, etc., is over $2.00 per capita; in Europe it is less than $.33. In forty-three cities of Europe, there are but .86 fires per thousand people; in the United States there are 4.05 per thousand. In Washington, a city of 300,000 people, there were 846 fires last year with a loss of $288,744, and the cost of maintaining its most excellent fire department was $433,920. And Washington stands well toward the head of the list of American cities for low fire losses and economical management of department. In Berlin, during the same peroid, a city of 2,100,000 people, there were 2,099 fires but involving a loss of only $169,205 and its fire department cost $312,000. Rome, a city of 500,000 people, had a loss of but $56,000 and its fire department cost $50,000. Figures and comparisons that may well make the Governors stop and think upon the wastefulness of their people.

Mr. Fitzpatrick will also point out to them the cure that is proposed. He maintains that if adequate legislation is enacted, compelling that all new buildings be at least moderately well built and that the old ones have such improvements made in them, involving little cost but rendering them less vulnerable to fire, this terrific tax will be reduced more than one-half inside of five years, and that we will be able to compare favorably with European cities within fifteen years. The one and only thing to do now, since we have insisted for so long in building shoddily, is to add no more fire-traps and to replace them, as fast as they are destroyed, with modern, well-built structures.

The Publisher's Corner

Enos Company's New Studios

There are two essential factors in the proper illumination of a residence, light and beauty. The possibilities in this direction are beautifully shown in the new studios of the Enos Company, of New York.

The Western office of this company has made remarkable progress during the past few years, due primarily to the fact that their product carries a degree of refinement and shows a variety in design and metal activity that is unapproached by any other manufacturer of lighting fixtures. This, together with the efficient management of Messrs. J. C. English and C. E. Roesch, who have had charge of this branch for several years, has made this one of the principal sources of supply for such wares on the Pacific Coast.

Appreciating the strong relation which exists between the lighting instrument and its surroundings, they make a point of conferring with architects and decorators, with a view of harmonizing the fixtures with the predominent scheme of the room, thereby securing the best possible result. In this, the practical element is not lost sight of, as the subject is considered as well, from the standpoint of efficiency, and the knowledge of the illuminating engineer is combined with the artistic sense of the decorator.

Those who contemplate building, or architects, with plans under way, will find an afternoon well spent in examining the reproductions of antique lighting devices, as well as the more modern examples of the designer's skill, so artistically displayed at 1748 California street, San Francisco.

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New Material for Floors—Absolutely Fireproof

The attention of architects, builders and contractors is called to a new material which is being used in the manufacture of art marble and onyx for flooring, for use in dwellings, hotels, stores, offices and hospitals. The material is a California product. It can be used on wood, expanded metal, or cement. It can be put on in any color, and will not crack or scale. For wainscoting it can be used as a plain plastered surface, or in slabs of any size or design.

For sanitary purposes in kitchens or sink, and in hospitals it has no equal; here it can be used to the greatest advantage. The material can be moulded into a curved base, thus removing entirely the crack next to the floor, which otherwise, it is impossible to keep clean. With the floor wainscot and walls made of this material a room is fireproof, waterproof and germproof. This material comes the nearest to being absolutely fireproof of any substance in existence, and will not warp with heat.

It does not expand, contract, warp or crack like cement. It hardens or sets in about forty-eight hours. Its specific gravity is about one-half that of Portland cement, and its porosity is like glass. Its properties are such that it adheres firmly to metal, wood, glass, or cement. Any variety of marble, can be exactly reproduced in this material. Its uses are almost unlimited, and we can safely say that it is not equaled by any article now in existence.

It can be produced at a price to immediately insure its universal use. The company handling this product has offices at 109 O'Farrell street, San Francisco, where they are exhibiting specimens of their flooring, art marble, and onyx. They have secured the contract for doing flooring, art marble wainscoting and counter in the First National Bank of San Leandro. The bank's architect is Creighton Withers, of 1835 Fillmore street, San Francisco.

Turns Out Good Steel

One of the busiest steel plants in San Francisco since the big fire has been the Pacific Rolling Mill Company of which P. Noble is the president and manager. A high grade steel is turned out by this company, a fact that is evident by the steady increase of orders. Among the buildings equipped are the following: Fairmont Hotel, Crocker building, James Flood building, St. Francis Hotel, Chronicle building, five buildings for the Crocker estate, Cosmopolitan building, addition to Mercantile Trust Company building, Bank of California, Jerome garage, State capitol in Sacramento and various new structures in San Jose, Stockton, Fresno, Santa Rosa and Oakland. Steel for bridges ready for erection is also furnished by this company. The main shops are at Seventeenth and Mississippi streets, San Francisco. They have been enlarged several times since the fire, so great has been the demand for material.

New Bank Building

Architect Eugene Mathewson of Fresno, has made plans of a bank building, to be erected at Reedley, for the Farmers and Merchants' bank. It will cost about $7000.

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Sand-Lime Brick Expert Comes to the Coast

Ernest Horstmann, a prominent German mechanical and civil engineer, has established himself in San Francisco, and opened an engineering and inspection bureau in the Monadnock building, room 299. Mr. Horstmann is an expert in the designing and construction of modern sand-lime brick plants and he has built quite a number of such plants, also mortar plants and cement plants, in Germany and foreign countries. He has studied with that minuteness which characterizes the German engineer, the development of the important industry in Germany, the native country of it, and his experiences will, without doubt, be valuable in the development of the young industry in this country. Later on this magazine will publish a series of articles on the sand-lime brick industry.

Annual Meeting of the Electrical Committee

The annual meeting of the Electrical Committee of the Underwriters' National Electric Association will be held in March, 1908, in New York City. The day and place of the meeting will be announced later. As usual, the provision of the National Electrical Code as they now exist will be the principal matter for consideration, and it is requested that any desired change in, or addition to, the Code, be forwarded to Secretary C. M. Goddard, 53 Kilby street, Boston, on or before February 1, 1908, in order that it may be printed in the bulletin, and the committee and other interested parties may thus have opportunity to consider same in advance of the meeting. As heretofore, the meeting will be open to all interested, and such persons will not only be welcome, but are urged to be present and give the committee the advantage of their experience and advice.

Milbradt Rolling Step Ladders

On another page will be found an advertisement of the Milbradt Rolling Step Ladders, manufactured by the Milbradt Manufacturing Company, St. Louis, Mo. Their ladders are widely and favorably known in all sections of the civilized world. The ladder illustrated is only one of sixteen styles that they manufacture. They make all their ladders to order, and to fit any place, are strongly built from the best hardwood lumber and metals obtainable, attractively finished so as to prove an ornament as well as the most useful adjunct to any store.

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Spokane to Build Many Concrete Bridges

Three interesting papers, dealing with the value of reinforced concrete and steel as construction materials in bridge building, were read at the "bridge" smoker under the direction of the Chamber of Commerce, Spokane, Wash., the evening of December 11, when 200 business and professional men were in attendance. F. E. Goodall, president of the organization, introduced the speakers. More than 300 views of bridges in various parts of America and Europe were shown in the stereopticon to illustrate the speakers' points. Charles McIntyre, city engineer of Spokane, was the first speaker, discussing the history, showing the development of the necessity for bridges; the location and cost of present and future structures, and the character of the bridges required.

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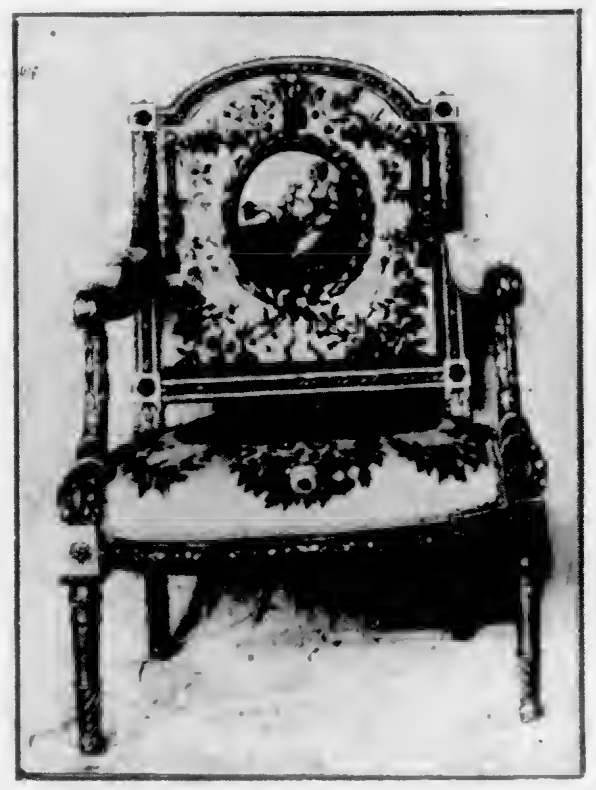

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S. H. Knight of Chicago, supervising engineer, in charge of construction work on the Washington street bridge, spoke on "Concrete, Its Uses and Abuses," saying among other things in dealing with the limitations of concrete as a building material:

"The use of reinforced concrete has been little short of marvelous, and it is the present-day engineering fad. Like most fads, it derives its popularity through an excess of zeal in the exploitation of one or more worthy objects, which all fads possess. It is now used in nearly every form of structure for which timber, steel or masonry is suitable. The greatest evil of concrete is that it has been crowded into uses for which there is small warrant for its adoption, as compared with older materials.

Bennett's New Process Pneumatic System

The attention of architects and owners is called to "Bennett's New Process Pneumatic System" for burning fuel oil for low-pressure steam and hot-water heating, pronounced the most practical, effective, and self-contained on the market, eliminating as it does, all possible objections to the use of oil as fuel.

This equipment is designed upon scientific principles and built on strictly up-to-date mechanical lines, no belts or sprocket chains forming any part in its construction; it is compact and durable, simple and automatic in operation, needing no attention except in starting, and meets in every way the requirements of the Fire Marshal and the Board of Fire Underwriters. It is an equipment that cannot fail to give complete satisfaction.

Architects are now specifying this system and in contracts already signed substituting the same for our Auxiliary Steam System which the Pneumatic System is designed to supersede. "Bennett's New Process Pneumatic System" can be seen in operation at almost any time in the Main telephone building, Bush street. Mr. Bennett states that the company's new Catalogue is in the hands of the printer, and upon completion a copy will be mailed to all applicants.

The company now occupies the four-story and basement building at 579-581 Howard street, new machinery having arrived which will enable it to turn out a complete oil burning plant with all its parts. Among the buildings equipped or being equipped with the "New Process Pneumatic System" are the following: Main Telephone Exchange, Grand Hotel, Aronson building, Robins Hotel, Boyd building, Hotel Arlington, Williams building, The Luxor, Imperial Hotel, San Jose, etc.

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Ransome Concrete Company

The Ransome Concrete Company is now located in its permanent offices in the Crocker building, San Francisco, with a branch office in the Union Savings Bank building, Oakland. The company is being congratulated on the recent completion of some contracts at costs considerably under the original estimates. This company is well organized and equipped to handle any work in the concrete line. Mr. I. C. Boss is president and manager of the company and Mr. Geo. D. Hudnutt is engineer. Mr. Ernest L. Ransome of New York, the pioneer in this country in reinforced concrete work and a former resident of California, is consulting engineer for the Ransome Concrete Company. The fireproof warehouse building of the Prospect Investment Company in San Francisco and the large factory building of the Oakland Cotton Mills are now being completed by this company, which is also engaged in erecting the plant of the San Juan Portland Cement Company at San Juan Bautista.

Hotel for La Jolla

Architect Henry Lord Gay, of San Diego, has prepared plans of a hotel building to be erected near the caves of La Jolla, San Diego. It is to cost about $50,000 and accommodate 100 guests. The building will be of the Mission type of architecture, two stories high and contain 75 guest rooms. The central portion of the building will be 40 by 35 feet from which two wings, each 75 by 35 feet, will extend in an oblique direction. Large terraces will extend along the front of the building at each floor. Every convenience for the harmony and welfare of guests will be considered.

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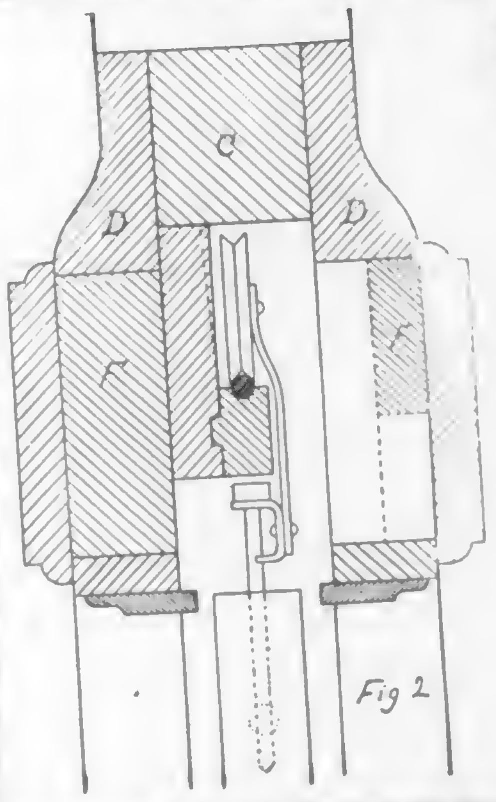

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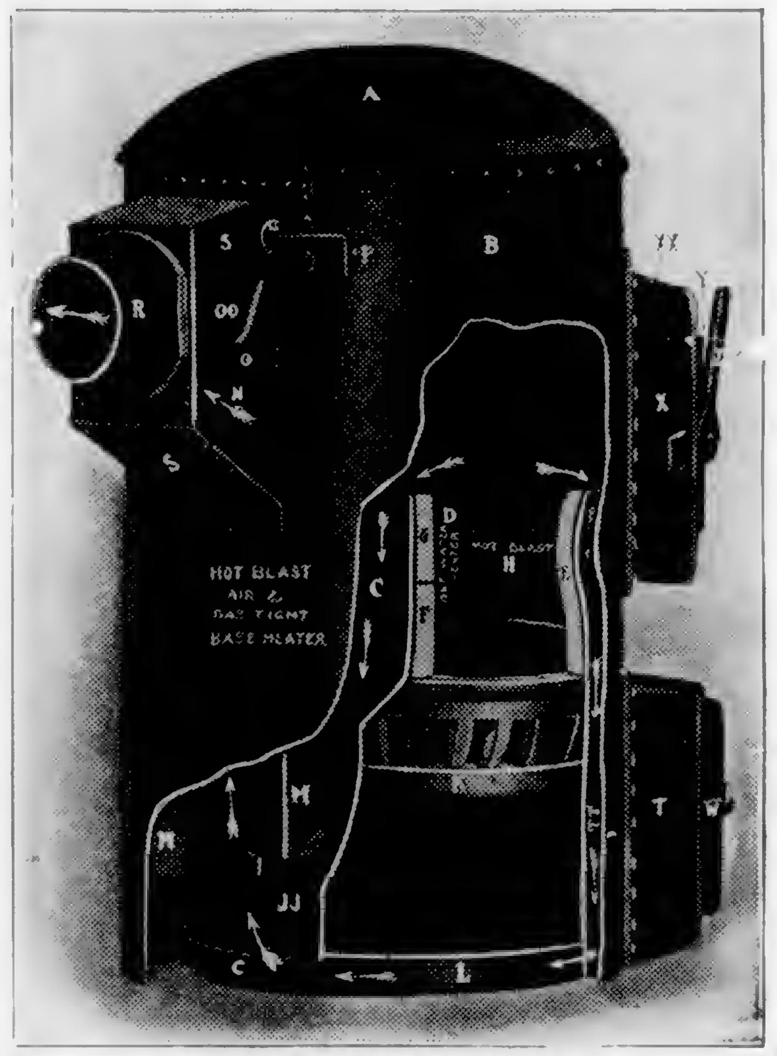

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Pacific Face Brick Company

Among the leading industries of the Northwest, which is playing an important part in the upbuilding of Portland, is the Pacific Face Brick Company, whose office is now at 401-402-403 Commercial Club building, Fifth and Oak streets, Portland.

This company is successor to the Newberg Pressed Brick Company, and at their factory, at Newberg, Or., they manufacture high grade face and ornamental brick. They also manufacture foundation brick, fireplace brick, ground clay, cut arch brick, chimney brick, fire brick and drain tile.

The company is now building a plant at Willamina, Oregon, where clay of a superior quality is obtained, with a capacity of 80,000 brick per day, for the manufacture of face brick exclusively, which will be completed February 1, 1908, at a cost of $150,000. With this added plant they will be able to meet all demands for brick of the highest quality.

Among the buildings for which this company furnished brick during the past season may be mentioned the Wells-Fargo, at Sixth and Oak streets; the Commercial Club building, at Fifth and Oak; the Lamson Hotel, at Eleventh and Stark; the Masonic Temple, West Park and Yamhill; Rothchild bnilding, Fourth and Washington; Gordon building, West Park and Yamhill; Baldwin & Downing building, Park and Alder; Buckman building, East Burnside and Union avenue; East Side Masonic Temple, East Eight and East Burnside; Healy building, East Morrison and Grand avenue; Friede building, Fifth and Pine; Oriental building, Second and Salmon; Shea building, First and Columbia; First National Bank building, St. Johns, and the Corbett building, Fifth and Ankeny.

Fire at Mangrum & Otter's

Mangrum & Otter, dealers in tiling, grates, mantels, stoves and steam heating, with headquarters at 538-40 Mission street, San Francisco, suffered loss by fire to the extent of $50,000 Christmas week. The fire originated in an adjoining building. The firm's loss was fairly well covered by insurance. The fire did not prevent the company from continuing in business and one of the good results of the disaster will be the erection of a substantial fireproof home for the concern.

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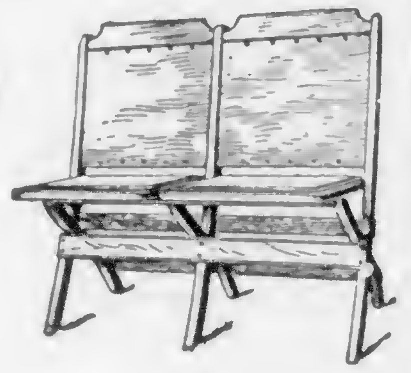

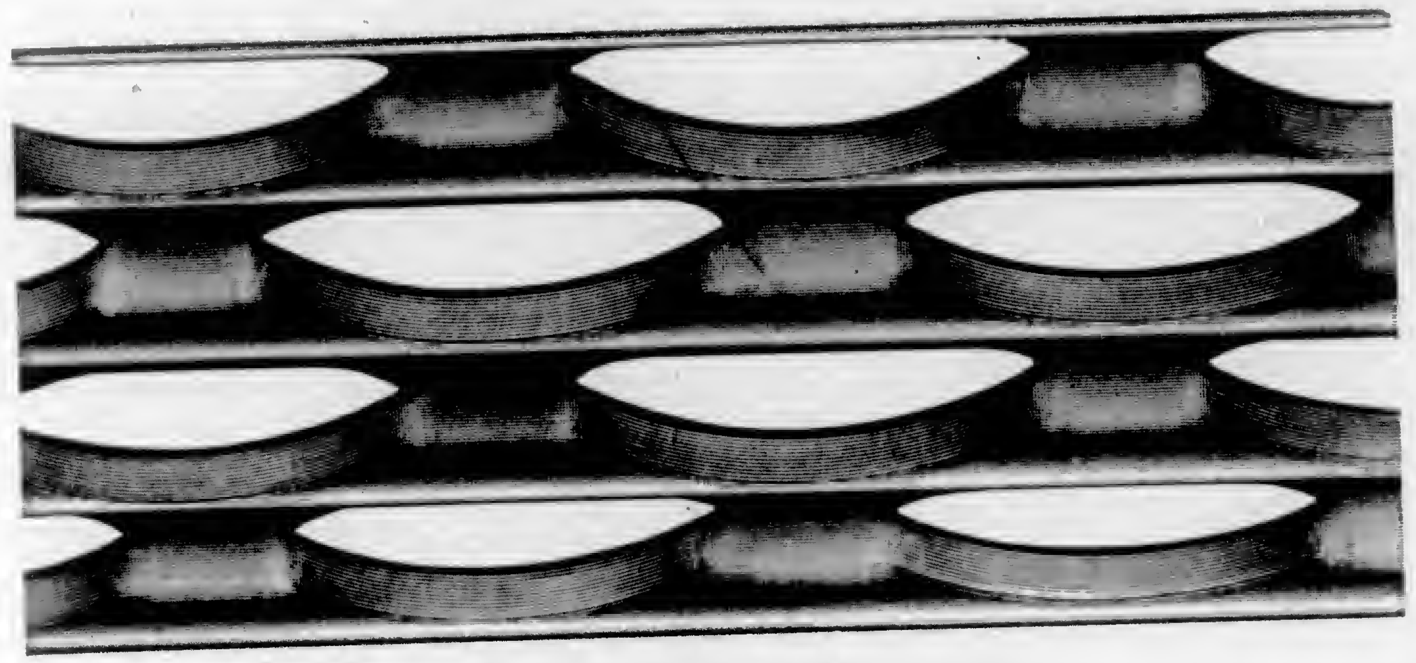

THE BOSTWICK STEEL LATH

Bostwick Steel Lath

This popular building material has achieved its eminent position only because it is a leader in its line. Note the illustration and it will be readily seen why.

Thrifty builders everywhere, recognizing the peculiar advantages possessed by "Bostwick" simply will not use other and less advantageous lath, for the reason that "saving" is to be considered always, even though "first cost" may seem adverse.

The very best buildings in this country, and from Pagoda to Palace in foreign countries boast of an interior covering of Bostwick lath.

It has become as familiarly and favorably known and appreciated among technical architects and contractors as an article may be, and to its favoring contingent are being added hundreds of adherents as the years roll by.

The characteristics of Bostwick Steel lath which place it in a distinct class are its possibilities along the line of economy of installation, and application of mortar. The expanded loops give just sufficient area to make a good tie or clinch without any waste of plastic material.

The linear corrugations make the sheet strong and stiff, causing it to be unyielding under the trowel.

These points make it possible for a workman to do more effective work with less waste of physical effort and for this reason, Bostwick lath is extremely popular with the plasterers.

Bostwick Steel lath, Bostwick Expanded and Bostwick Metal Corner Bead are being marketed by the McCormick-Henderson Company, No. 110 Bush street, San Francisco, Cal., and the Western Lime Company, Colman building, Seattle, Wash. Mr. A. J. Capron, Agt., Ainsworth bldg., Suite No. 17, Portland, Ore.

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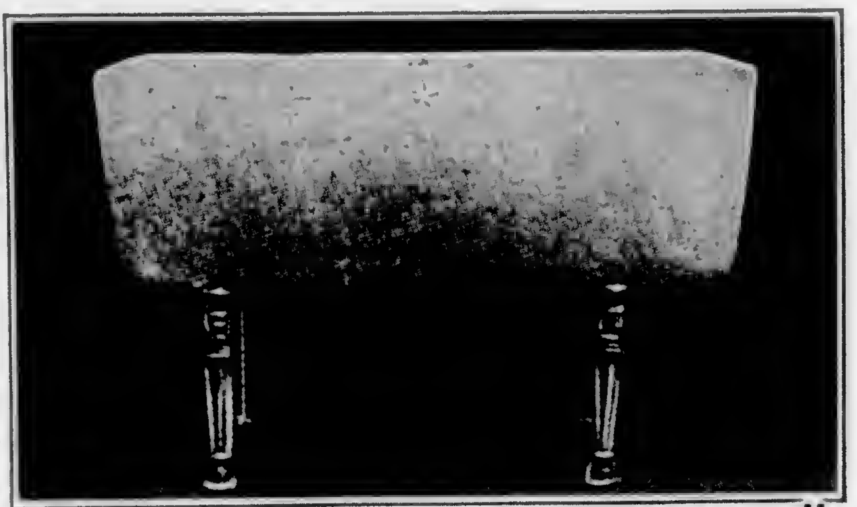
Make it a point to see that you get all you need is buying a block machine—not simply a start toward it. Make a note of this, as it is very important.

Some buildings require walls using blocks eight inches thick, some ten inches thick, and some twelve inches thick. The first contract you get may require walls of two thicknesses—they often do. See that your machine will make all of these different widths, and find this out before you part with your good money. It is not pleasant to find this out afterward and pay out a lot for something you should have received as part of your machine. You know the first requisites of business success are the stopping of unnecessary expenditure, which means getting all you need at the least expense. What you do not part with you still have. Be sure you get a face down machine. Write the National Cement Machine Company, Bay City, Mich.



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Redwood Manufacturers Company, Oakland, Outgrows Old and Moves into New Home

The Redwood Manufacturers Co. of Oakland, which is under the able management of Mr. W. A. Boscow, recently moved from its old location at First and Alice streets into its new home—a mammoth building erected at Fifty-seventh street and Santa Fe tracks. An excellent likeness of the building is shown on the opposite page.

As a structure devoted exclusively to the housing of doors, sash, interior finish and millwork, it is probably the largest of its kind around the bay, since it contains three floors, each having a floor space of over 14,000 square feet, in addition to a loading platform a full block long, a railroad siding adjoining its building with a capacity for eleven cars, and yard facilities fully one block square.

With the growth of the company's business the capacity of its former location at First and Alice streets was found to be too limited to satisfactorily handle the increased volume of trade, and Mr. Boscow, with an eye for a more nearly central location, selected the present site which already has demonstrated its superiority.

The Redwood Manufacturers' Co. is a corporation composed of a majority of the redwood lumber manufacturers of the Pacific Coast. It was formed principally for the purpose of developing the field for redwood products, and the results so far obtained have been entirely satisfactory.

The factories and assembling yards of the company are situated at Black Diamond, Contra Costa County, Cal., where the stock goes through an air-drying process, for which purpose that locality could not be excelled, owing to the wind storms prevalent there. It may be added that the site of the present yards and plant at Black Diamond was chosen principally because of the presence of that great aid of nature in the warm winds that are intermittently blowing there. The lumber is shipped from the north to this point, at the junction of the San Joaquin and Sacramento rivers, by the company's own fleet of steamers.

The San Francisco business of the company is handled by its sales office and warehouse located at 453 Bryant street.

To dispel any misunderstanding likely to occur, owing to the firm name, it should be stated that the Oakland distributing house by no means confines itself exclusively to the sale of redwood products; it purposes to cover the field in a thorough manner, consequently it is in a position to meet the demands of the trade both for redwood and for pine. Hence, in addition to a complete stock of redwood doors and redwood mill work, it carries a heavy stock of Oregon pine doors and interior finish; also white pine doors, and everything else that a progressive institution of its kind should handle. To those who wish the best, both in quality and workmanship, the company commends itself.

An important branch of the Redwood Manufacturers' Co. is its Tank department. It has perhaps the best equipped and most complete tank factory that is to be found anywhere. To intending buyers of wine, water, oil and mining storage tanks, the company has for distribution printed matter of an interesting and attractive character, which they will be only too glad to supply on request.

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A Foolish Strike Aimed to Injure Architects

Because D. H. Burnham & Company, architects of the Mills building, now being reconstructed in San Francisco, refused to order out the Otis Elevator Company's men, who were repairing certain pipes connected with the lift, and allow the substitution of workmen from the Steam Fitters Union, P. H. McCarthy called out nearly 500 men employed on the building. This happened on December 23d. The labor leader's action was so unjust, however, that the Building Trades Council refused to stand by McCarthy and ordered the men to return to work which they did gladly, for none was in sympathy with the walk-out. The dispute originated over the work of four men, involving a possible expenditure of $40, and all parties directly concerned were "union" men. It was not a question of a fight with employers. The employers cared absolutely nothing about the matter and were not in the least interested how it was settled. It was not a case of union men versus non-union, for both parties to the dispute were union men in good and regular standing in unions duly affiliated with international organizations. Certain piping had to be done, as part of the necessary work of installing the elevators. McCarthy insisted that the pipes be fitted by the Steam Fitters' Union, and demanded that the architect should order out the elevator constructors. This the architect had no power to do, as the elevator contractors have the right to employ whom they please. McCarthy, after calling out nearly 500 men, threatened to "tie up" all the buildings being constructed by D. H. Burnham & Co. throughout the United States.

The iniquity of such a thing was self-evident. The architects had absolutely no power in the matter. The sole duty of the architect is to see that the contractors execute their work according to the plans and specifications. The contractors do not deal with the architects but with the owners. They must do their work to the satisfaction of the architect in charge, but with what men they shall do it the architect has no concern. If a dispute in respect to labor arises, no one but the owner can represent the building. And yet McCarthy proposed to "tie up" all buildings going up under the direction of D. H. Burnham & Co. throughout the United States because the representative in San Francisco would not promise to do what he had no authority or power to do.

Berkeley Has Woman Architect

Berkeley has a woman architect in Miss Minnie Jackson, the daughter of Franklin H. Jackson of the Byron-Jackson Machine Works. There has recently been finished at Shattuck avenue and Sixty-third street a substantial church building which was designed by and erected under the supervision of Miss Jackson.

So satisfactory has been the work of Miss Jackson, who is the only girl graduate in architecture from the Wilmerding School, that she has been brought to the attention of the Methodist Conference, and has been asked to draw the plans for a new church at Bishop, Inyo county.

The church is an unusually handsome one for its size. It has a seating capacity of 400, and, by careful planning, it was arranged that by throwing open the lecture room annex, an additional 200 could easily find room in the church.

Miss Jackson, who is 24 years old, lives with her parents at 1634 Oregon street. She calls her design "the American style of architecture," and claims that it was not very hard work to plan a church, when she was so intensely interested in the work.

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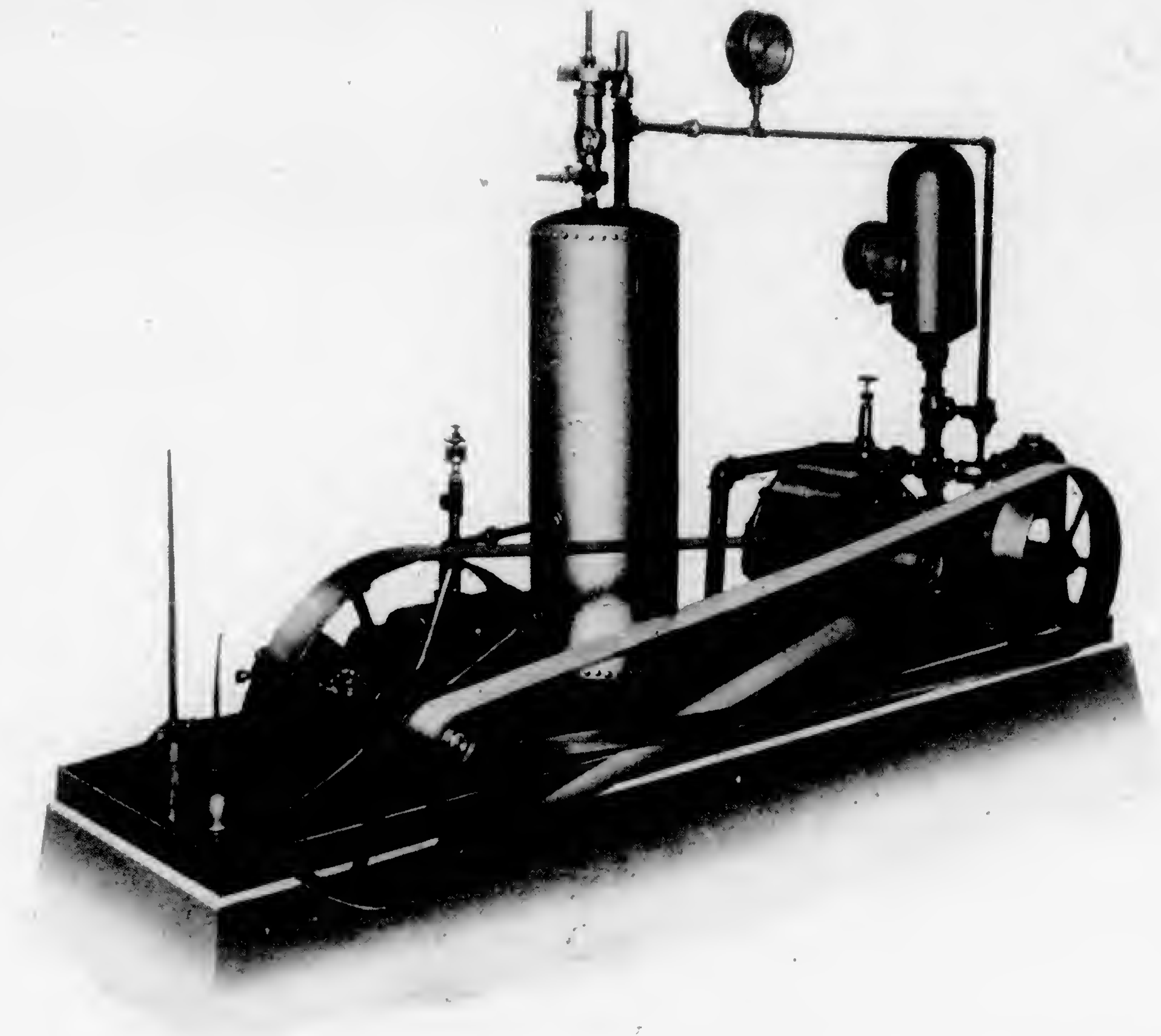

Witt Automatic Oil Burning Plant Installed in the Sherman Clay Building

G. E. Witt Company's Automatic Oil Burning Apparatus

THE above halftone was taken from the plant installed in the Sherman and Clay building, corner of Sutter and Kearny streets, San Francisco, which plant is under guarantee to be entirely automatic and to run eight hours without attention and not to vary more than one-half pound from the desired steam pressure, and to give perfect combustion.

The plant consists of one double acting air compressor, size 4½x4½ inches; one rotary oil pump, one-eighth horse power, and one two horse power motor.

This compressor is built to work on any pressure desired, from one to one hundred pounds, and it has more than ample capacity to do the work required. It is now being run at fifteen pounds air pressure and ten pounds oil pressure.

The apparatus used on this plant is of the highest grade and is equally as good as any oil burning plant installed on steamers burning oil at sea.

Witt burners are now being used throughout the United States and foreign countries. They have been adopted by the United States Government and by such companies as the Southern Pacific R. R., the Santa Fe, the California Northwestern Railway, the California Fruit Canners' Association, the California Wine Association, and are handled by Messrs. Henshaw, Bulkley Co., Baker & Hamilton, and many of the larger hardware and machinery houses in San Francisco.

Almost any kind of a plant will burn oil in some way, but to get the highest efficiency you must have the proper oil burners and a plant to back it up. A catalogue will be mailed free on application. The G. E. Witt Co., 1163 Howard street, San Francisco.

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Among the large buildings in Portland in which the W. G. McPherson Co. has installed heating and ventilating plants may be mentioned the Portland Hotel, the Portland Art Association, the Multnomah Block and the Mitchell-Lewis & Staver building, all designed by Whidden & Lewis.

In the Portland Hotel, what is claimed by authorities to be one of the most satisfactory ventilating plants for hotel kitchens in the country, is installed. While the system is simple, consisting of withdrawing all steam, smoke, foul air, etc., from the kitchen by means of a large electrically-driven exhaust fan, and is the same as in use in many hotel kitchens throughout the country, the design of such an installation to give satisfactory results entails much more thought and study than would be apparent to the casual observer. Through a system of galvanized-iron piping, connected to the hoods over the ranges and at other points, the air is drawn through ducts to the fan, which is located in the basement. By this fan the air is forced upward through a large copper lined shaft to the roof of the building and thence to the atmosphere.

Among other notable installations by this firm is that in the Multnomah Block. The first floor being occupied chiefly by the banking rooms of the Security Savings and Trust Co., has a complete ventilating plant. The balance of the building is heated by a vacuum system of direct steam heating. The operation of the ventilating plant for the banking rooms may be outlined briefly as follows: Fresh air is drawn from outdoors down through the vertical brick shaft to the basement, wherein are located a fan and other apparatus comprising the plant. Passing down this vertical flue the air is exhausted through an air washer, so constructed that it is entirely freed from all impurities and afterward dehumidified to the proper degree. This is accomplished by passing air through a fine cloud of water and thence through what is termed an eliminator, water being forced through spray nozzles, so constructed as to completely atomize it. The same water is used over and over again, being pumped up from the settling tank by means of an electrically-driven centrifugal pump, thence forced through the aforesaid nozzles, the operation being continuous. In this manner the expense for water is almost absolutely nil. The water after passing through the air washer is warmed to a temperature of 70 degrees, this temperature being maintained automatically by a thermostat, and is then forced by the fan through the heating coils proper, passing successively through the mixing dampers, ducts and registers into the rooms to be ventilated. The temperature of the air entering the room being constant in volume is regulated by the Johnson System of Automatic Temperature Regulation. This system, as is well known, reduces the steam consumption to a minimum. The foul air escapes through ornamental concealed outlets located in the ceiling of the rooms ventilated, passing into the foul air shaft to the out doors.

The Largest Purchasers of Tile in the Northwest

This distinction is claimed by the Portland Tile and Mantel Company of Portland, which has used eighteen carloads of tile during the eighteen months it has been engaged in business. The tilings are used in the Commercial Club building, the Baldwin building and many other of the large buildings in Portland, besides in many residences.

Besides supplying Eastern patterns the company originated several designs for the exclusive use of its customers.

Portland Elevator Company

This company was established in 1905 and is composed of A. W. Grover, formerly with the Otis Elevator Company and V. J. Nelson. They make a specialty of Belted Elevators, Wood Lifts and Dumb Waiters. Their specialties have been installed in the following Portland buildings: Willamette Iron Works, M. Seller building, Corbett building, corner of Front and Oak, Raleigh building, Acme Mills, Diamond Brick Works, Robertson Standard Steel Company's building, American Chicle Company's building, Fisher-Thorsen building, Union Oil Company building, Failing building, and Neustadter building.

Portland Hardwood Floor Co.

This concern has recently moved to their new quarters at 286 Yamhill street, Portland, where they are displaying a larger stock than ever before of attractive designs in hardwood flooring, with an increased force of skilled workmen; they are equipped to speedily execute all orders received. Their new catalogue for 1908 is now ready and will be mailed upon request.

Promotion for Mr. Rhines

Mr. F. K. Rhines, engineer, has been made assistant to the treasurer and general manager of the General Fireproofing Company, the position having become effective the first of the year. Mr. Rhines formerly was engineer with the Cast Iron and Machine Co., bridge builders at Lima, Ohio, and more recently was chief engineer and general manager of the Dixon Engineering and Construction Company of Toledo, Ohio .

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12

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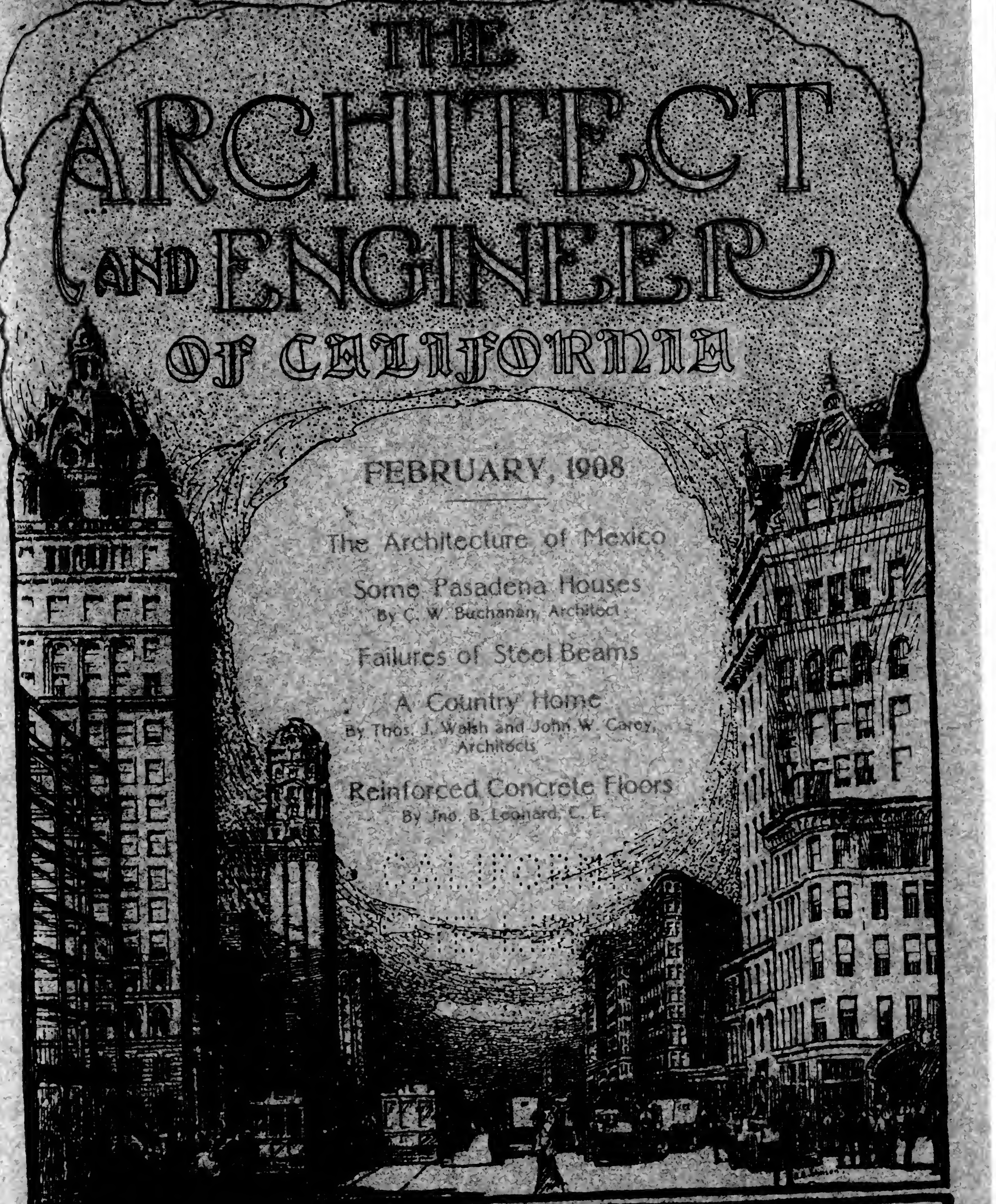

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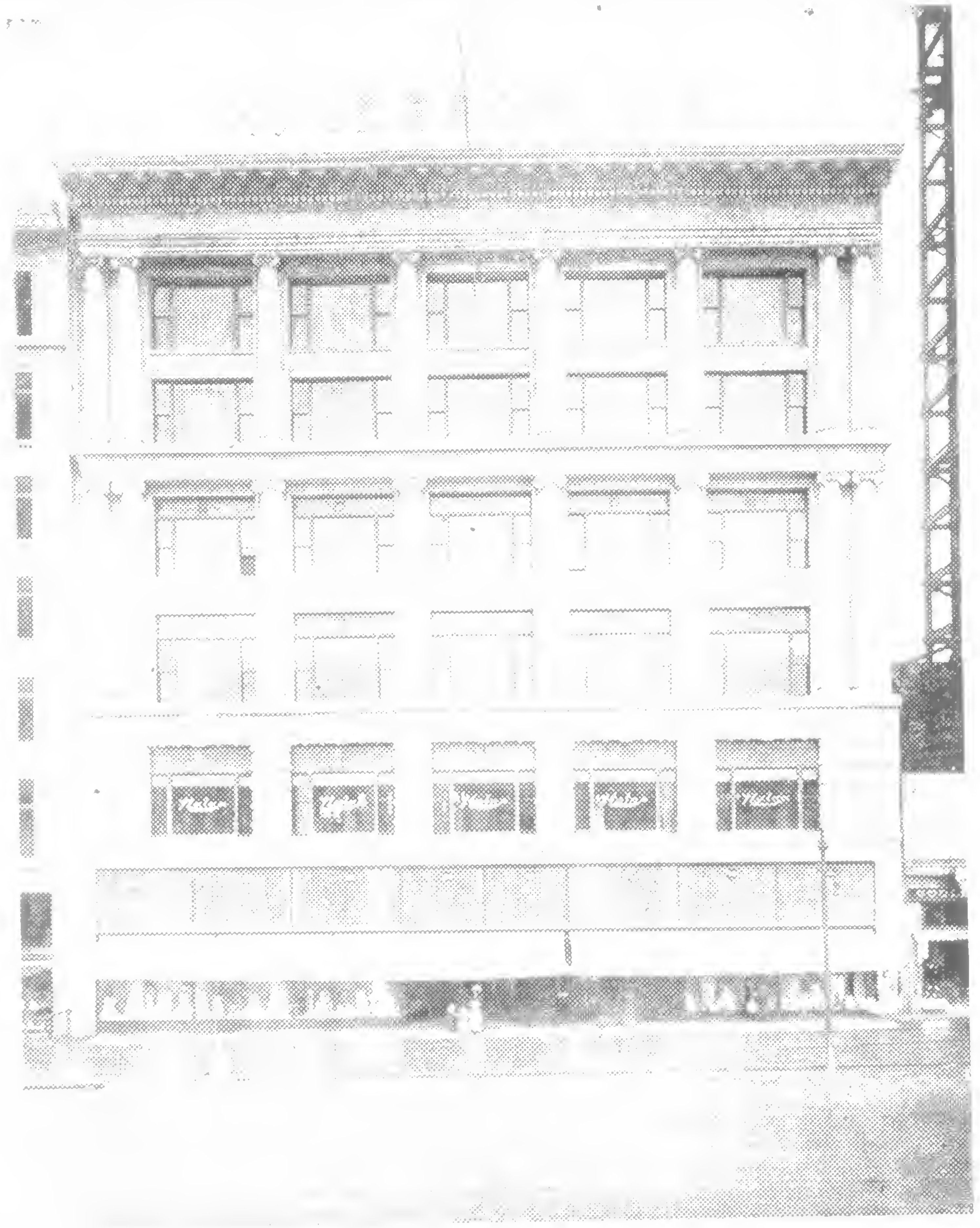

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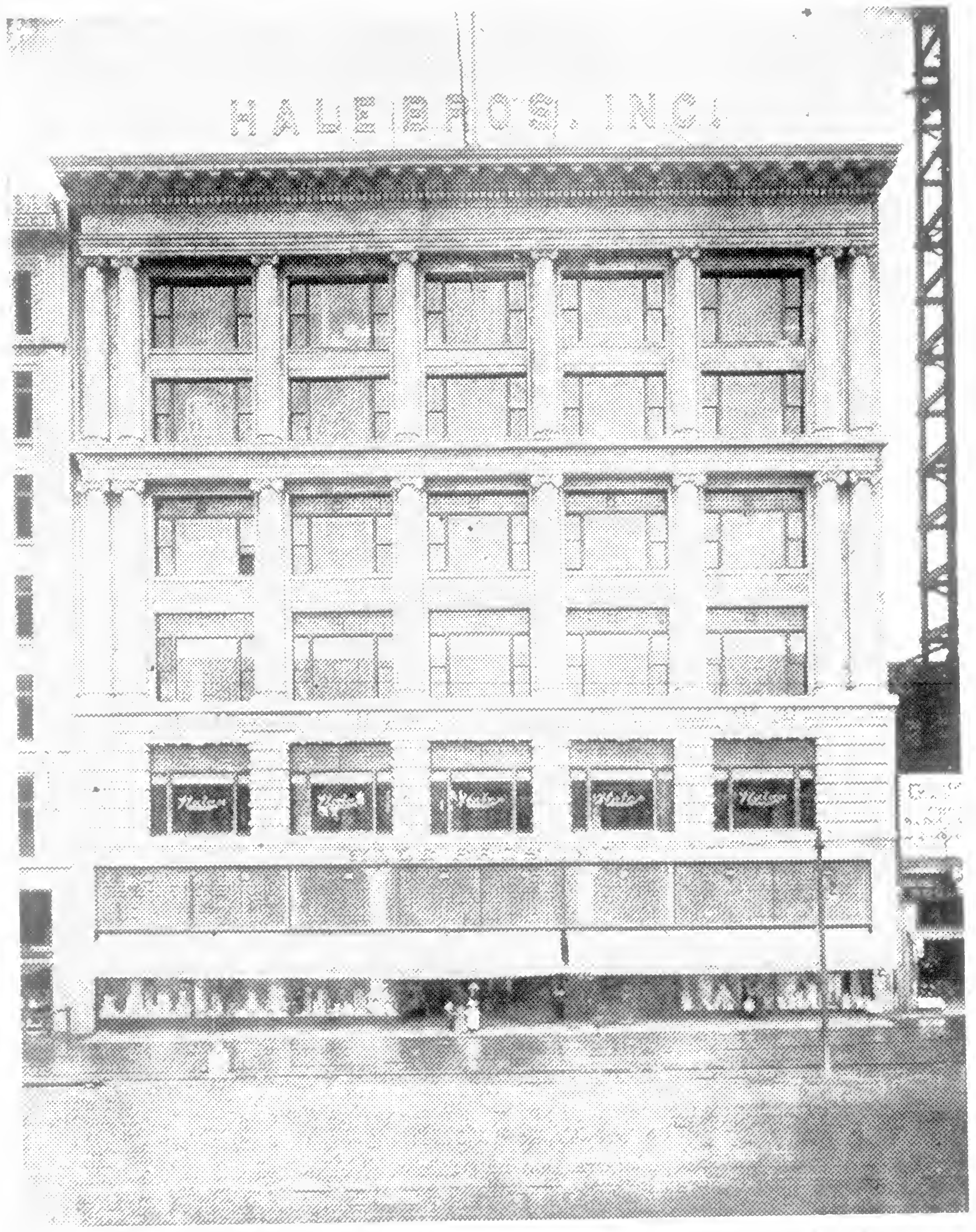

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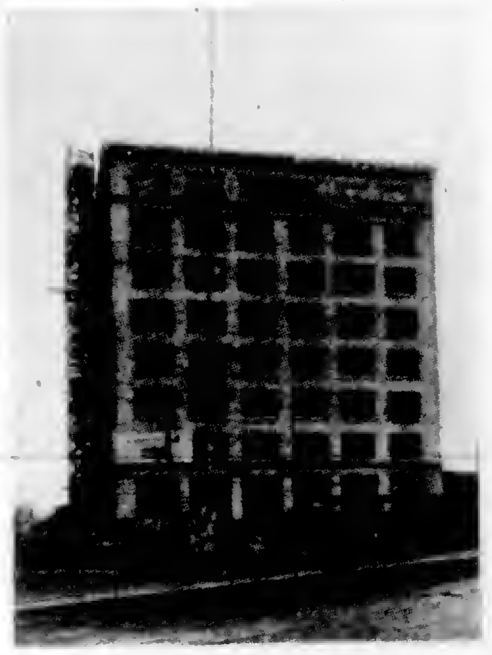

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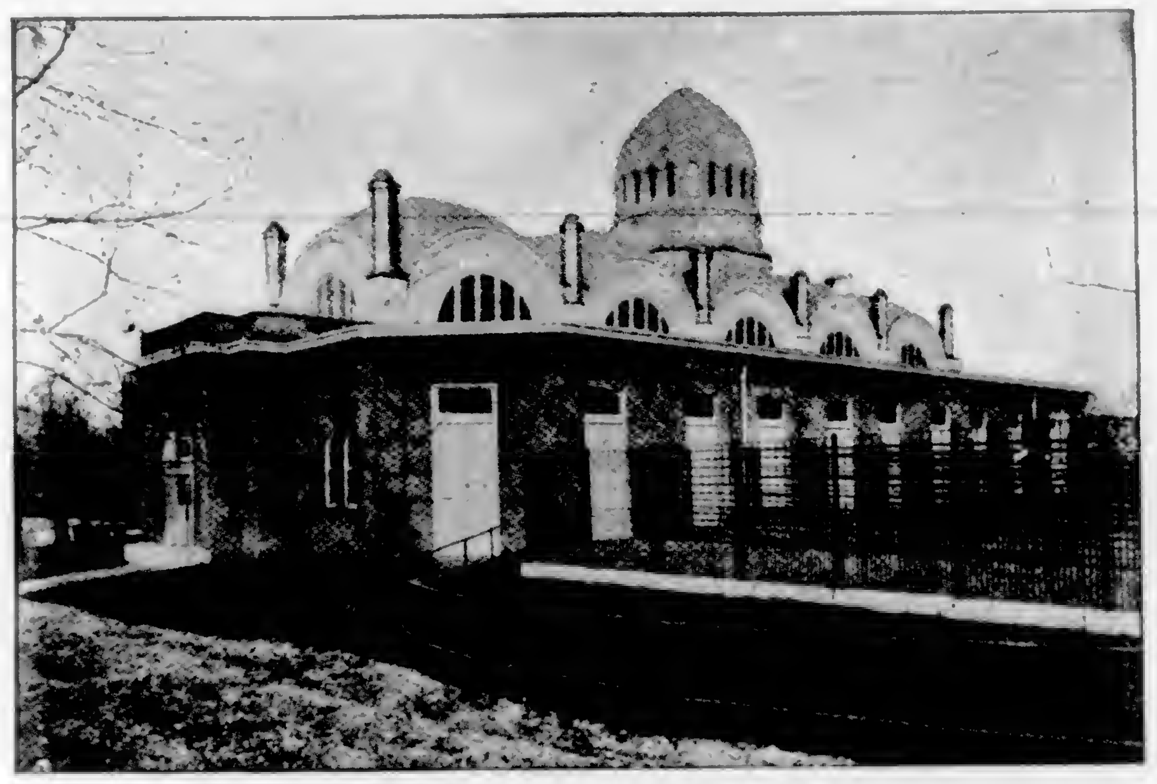

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Cincinnati, Ohio, Dec. 22, 1906.

Sandusky Portland Cement Co.,
Sandusky, Ohio.

Gentlemen: The resurfacing of our new Herbivora Building, at the Cincinnati Zoological Gardens, with your Medusa Compound was completed early in this month and included all of the five domes and the supporting walls above the first story.

When we applied to you last September, these roofs, laid with concrete after the ordinary methods, were leaking in every section, and we were facing the problem of leaving the animals in their old winter quarters, and were seriously considering the great expense of a complete metal roof next spring. Our committee was more than skeptical of success with concrete in any form, and I confess that we undertook the responsibility of trying your compound with great reluctance. * * *

The work has been in progress since October and has been slow and difficult, owing to the very complicated character of the roof surfaces but the delay has enabled us to test it both with heavy rain storms and melting snow. The result is perfectly satisfactory under these conditions and there is not a sign of a leak in any part of the roof or walls.

Very truly yours,
(Signed) W. W. TAYLOR,
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Pacific Elec. Bldg., L. A.
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T. A. Pettus, Arcade Building,
109 O'Farrell St., S. F.
Globe Const'n Co......Chronicle Bldg, S. F.
The James Stewart Company,
Gunst Bldg., Third and Mission Sts., S. F.
Gibson, McIntyre & Satterlee,
1116 Crocker Bldg., S. F.
The Lindgren-Hicks Co.,
2d Floor Old Humboldt Bank Bldg., S. F.
Delmar Smith Co........Kohl Building, S. F.
Ransome Concrete Co...Crocker Bldg., S. F.
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406 Sutter St., cor. Stockton, S. F.
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106-11 Hansford block, S. F.
O. M. Bullock.....1420 Broadway, Oakland
Von der Horst Bros.,
French Bank Bldg., S. F.
T. S. Brown Const'n Co., Pacific Bldg., S. F.

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Holt, Habenicht & Howlett.269 Fell St., S. F.
MacKay & Co.........787 Market St., S .F.
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United Glass Co.........115 Turk St., S. F.
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Henshaw, Bulkley & Co.,
219 Spear St., S. F
335 E. Third St., Los Angeles
Machinery & Electrical Co.,
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164 N. Los Angeles St., Los Angeles
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Steiger and Kerr Stove and Foundry Co.
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207 Grant Bldg., S. F.
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16th and Carolina Sts., S. F.
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Klatt-Hirsch Co.........113 Front St., S. F.
Paraffine Paint Co.,
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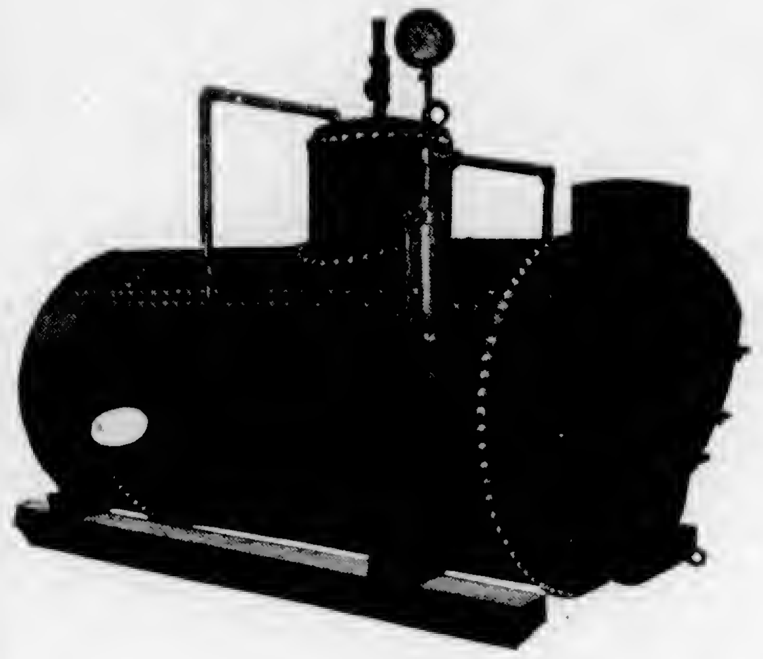

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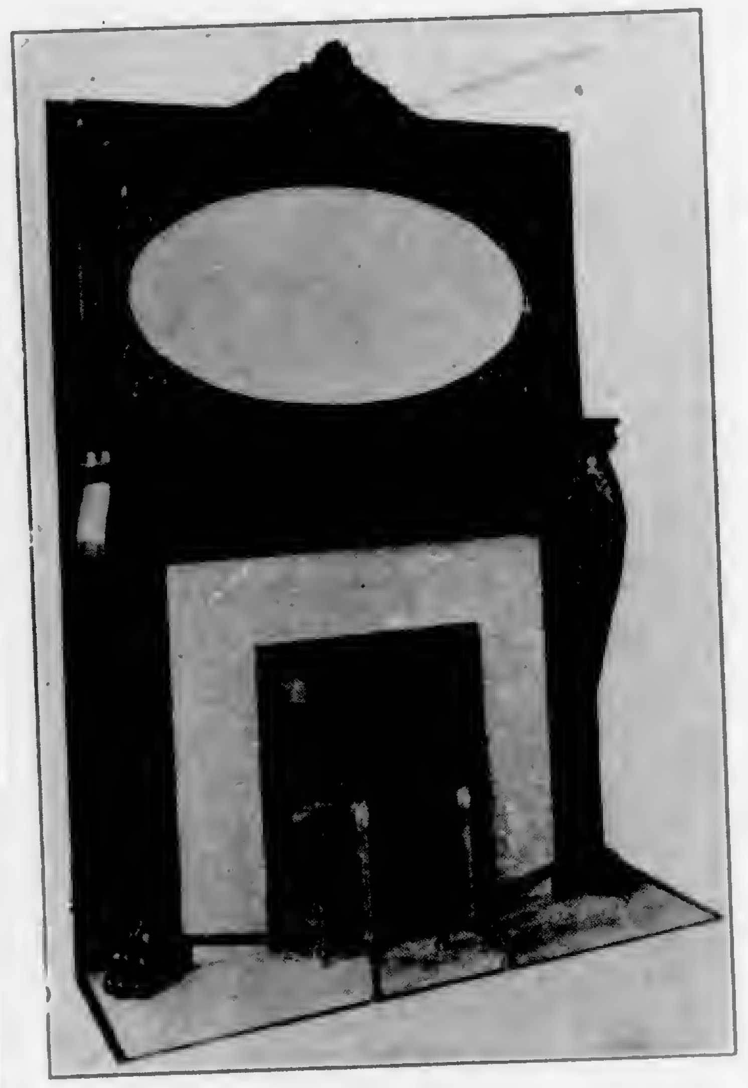
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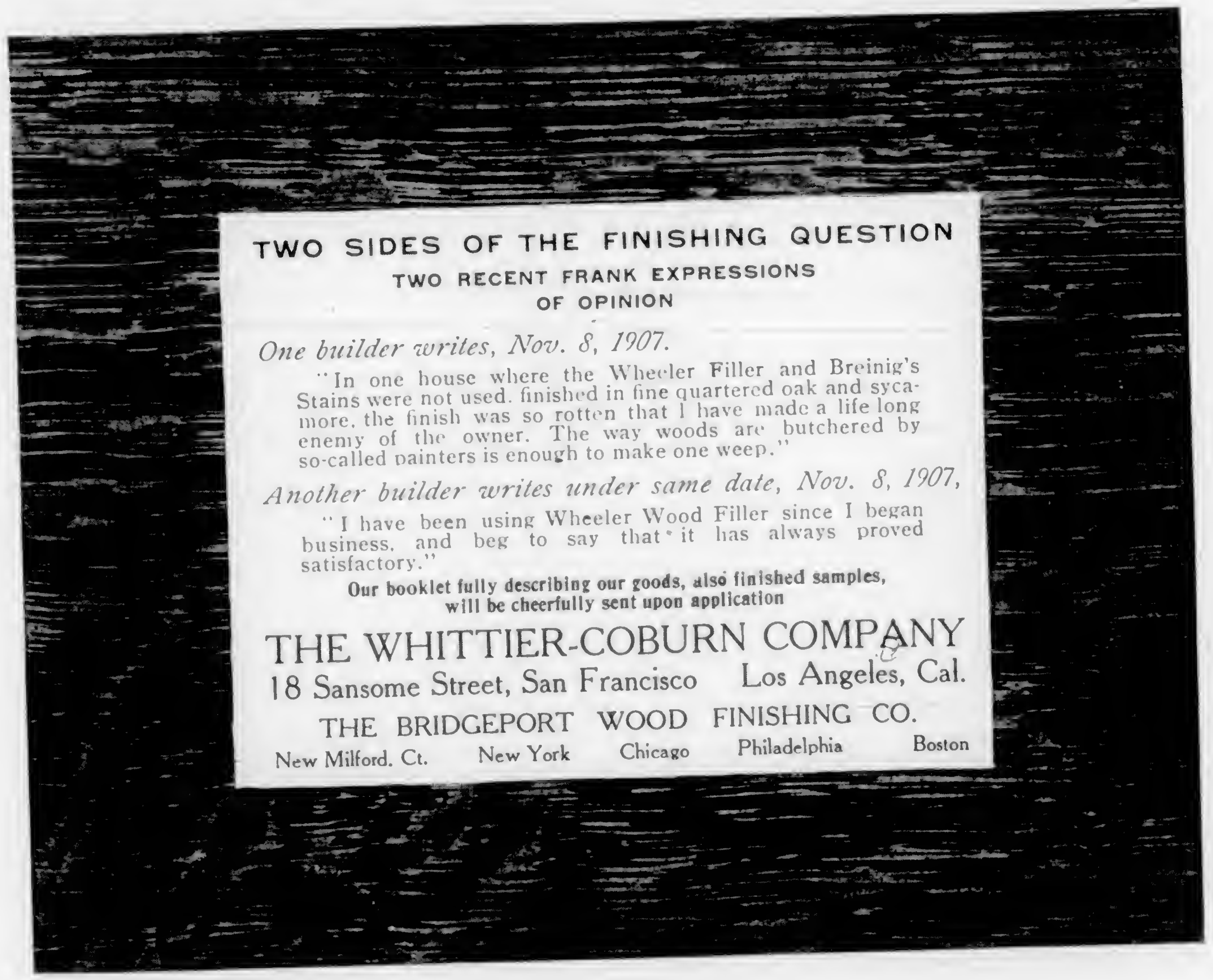

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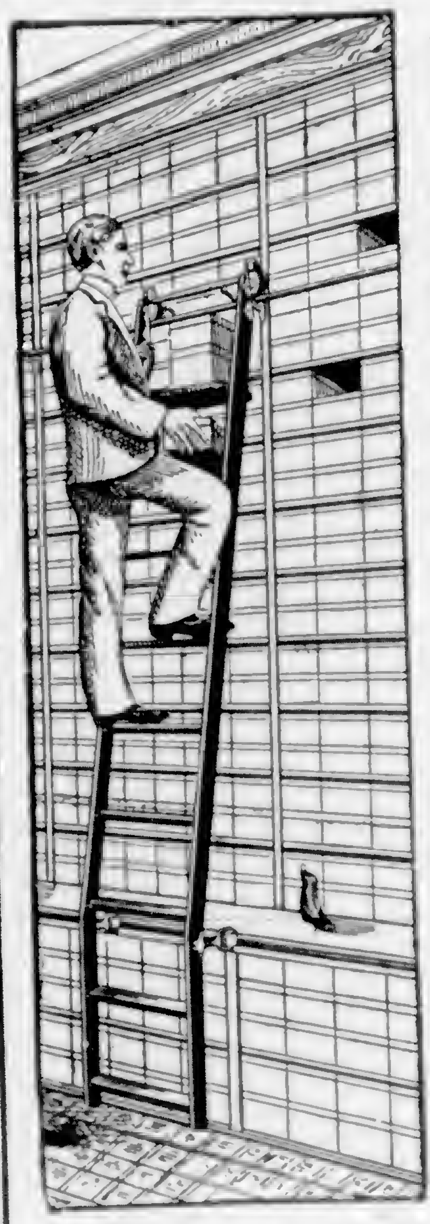

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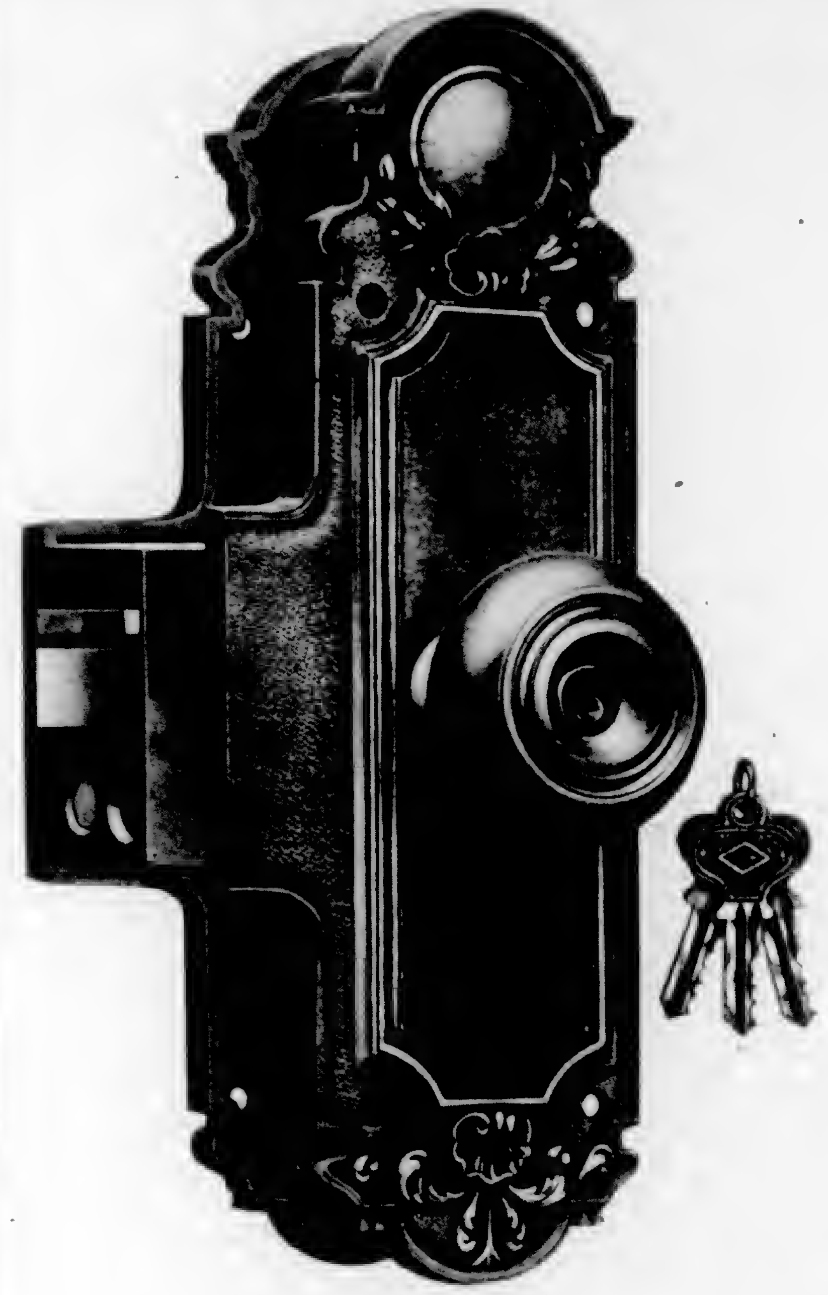

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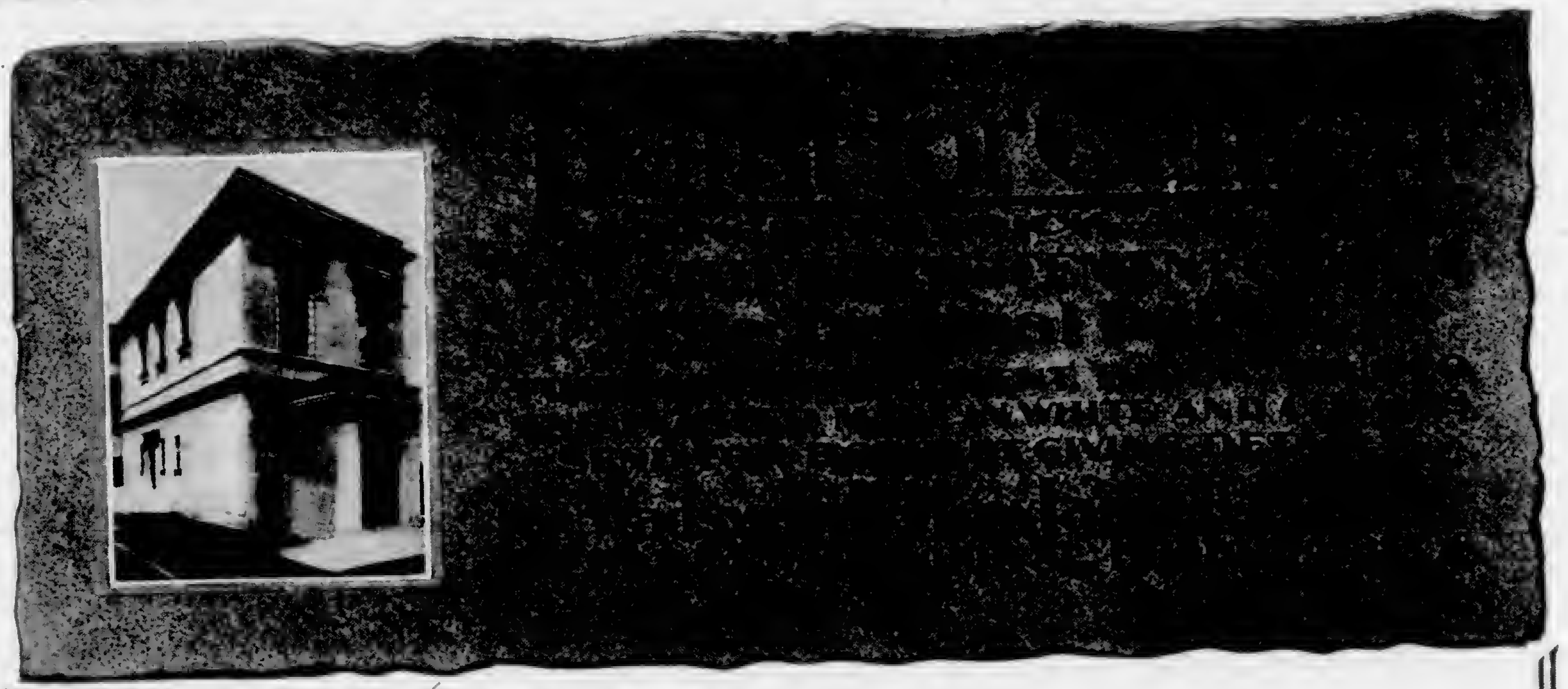

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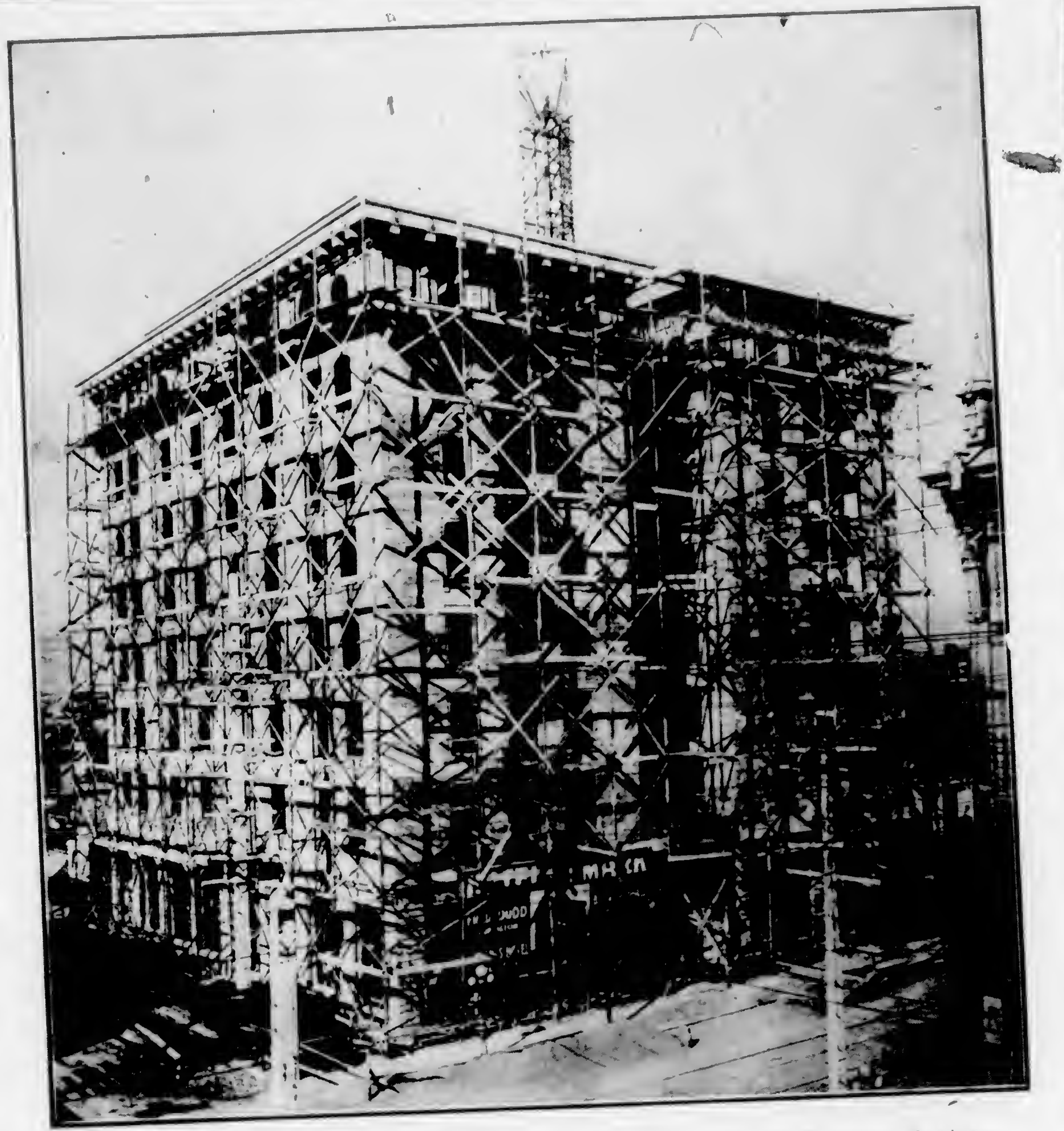

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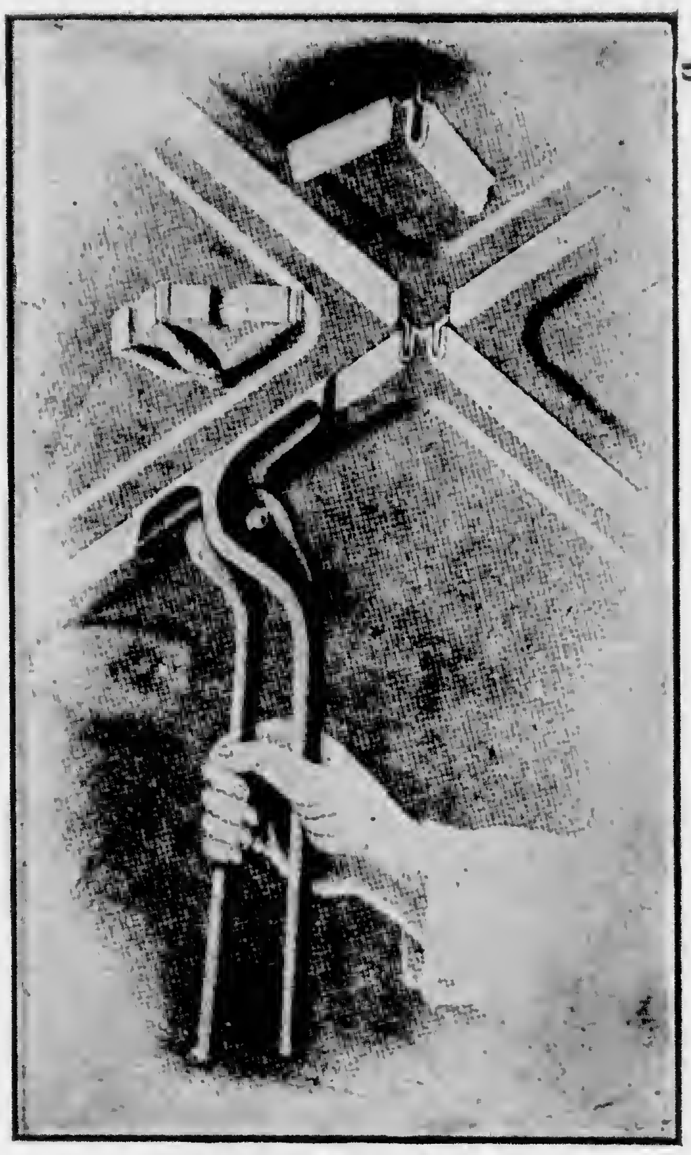

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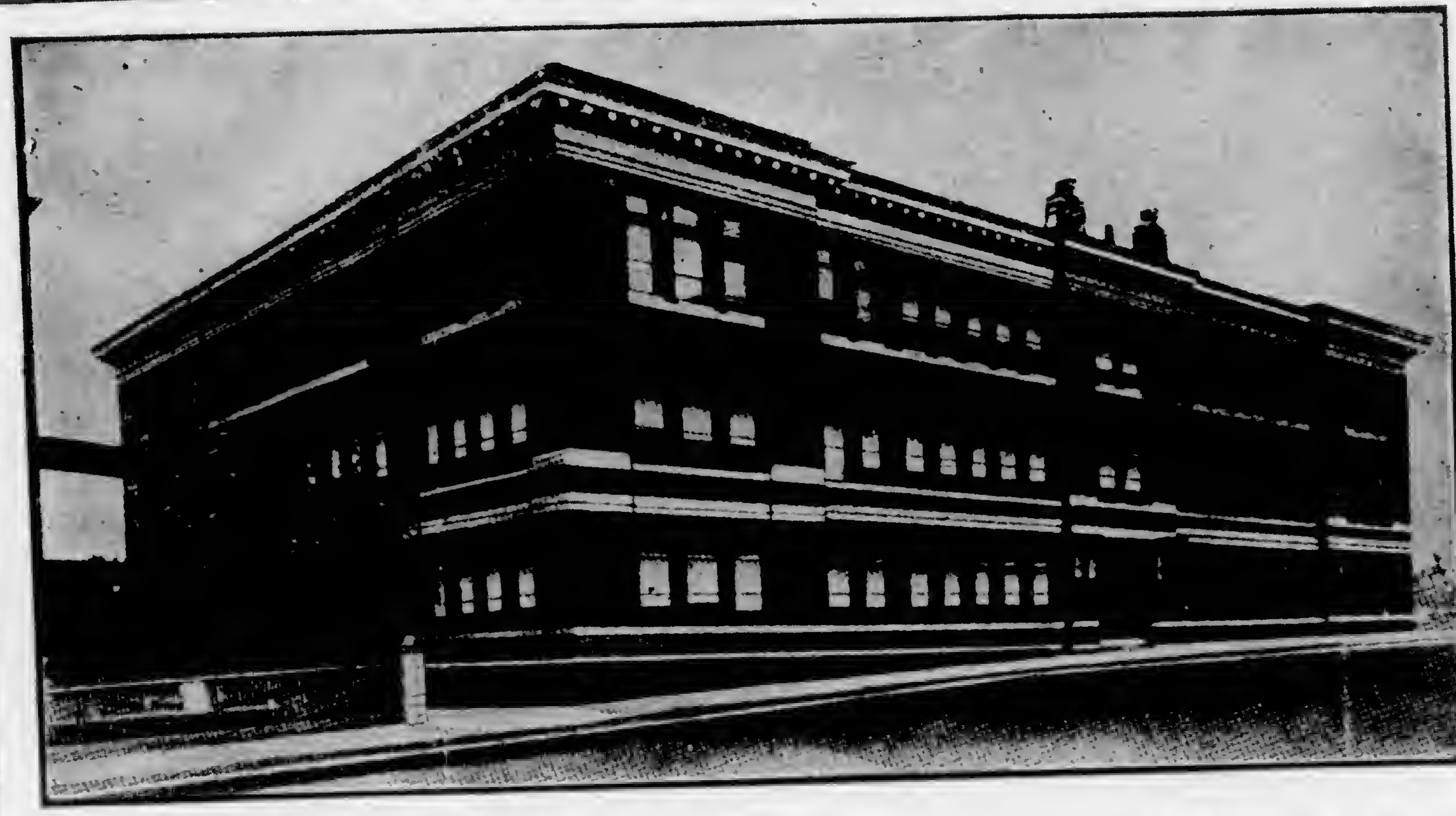

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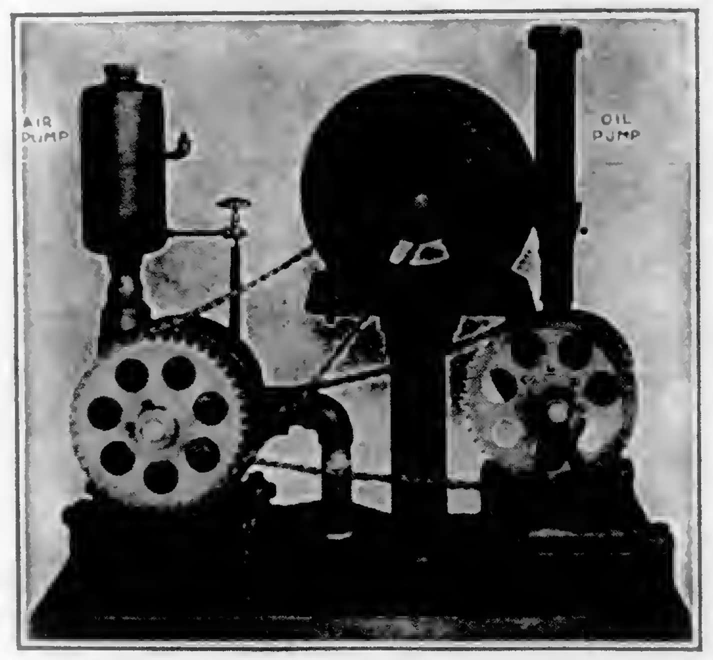

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Vellucent Panel, "Ceres"—painted by Granvel Fell. Cedric Chivers, Bath, England
Shown at the Portland Exhibit —*William W. Kellogg*

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THE JAS. D. PHELAN BUILDING
Market and O'Farrell Streets, San Francisco, Now Under Construction
William Curlett, Architect

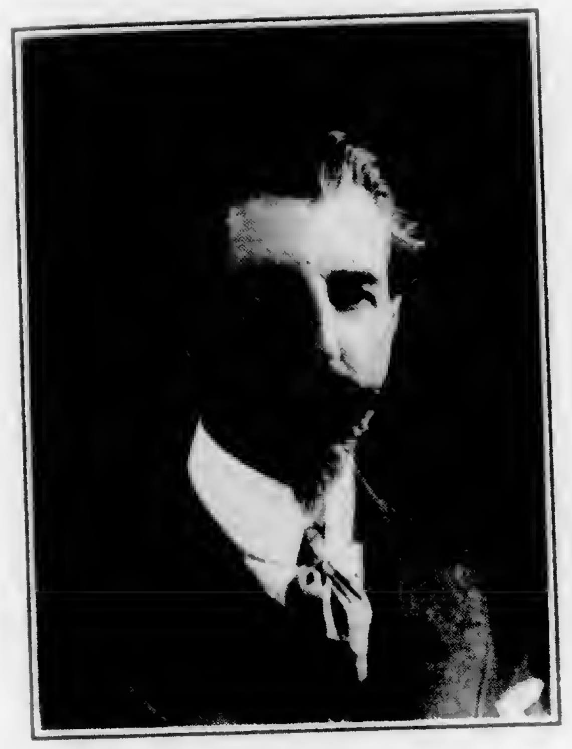
Frontispiece, The Architect and Engineer
February, 1908

THE
Architect and Engineer
Of California

VOL. XII. FEBRUARY, 1908. No. 1.

The Architecture of Mexico*

By W. GARDEN MITCHELL, Architect



W. Garden Mitchell

WE LIVE on the borders of a land, that to us, architecturally at all events is a terra incognita, and yet in this land of Mexico, a small country if we measure it by its cities, is to be found proportionately more good architecture and less bad, than any country with which I, at all events, am acquainted.

This is to be accounted for not from the fact that the architecture of Mexico equals or surpasses the best work in Europe, Gothic or Classic, for this is not the case, the best work in Europe is doubtless better than the best in Mexico, but from the fact that while in Europe we have had good and bad periods of architecture, also primitive and highly civilized periods, in Mexico we have the result of one short period, and that a good period, the Renaissance.

Tracing the development of architecture in Spain I cannot speak with any degree of assurance, as to its advancement from point to point, but we do know that as far back as the Moorish conquest Spain had developed a high sense of artistic perception, evolving in Moorish and Gothic times many fine specimens of architecture, but at the period of which I speak the knell of Gothic architecture, that perhaps most fascinating of all monuments in stone, had struck. By some strange freak of fancy, that high, but in some sense narrow conception of life peculiar to Gothic and medieval times was to give place rapidly to the broader influences of a civilization that dates back through Roman, Greek and Egyptian periods to the dawn of history. In Italy it was truly a Renaissance or rebirth, in northern Europe, including France and England, it was more correctly, the understanding and adaptation for the first time of the broader view point of the Greek and Roman conceptions of life, with the discoveries of then modern times added thereto.

At the period of which I speak, was commencing the rapid unfolding of a brilliant age, not in art alone but along all lines of thought. A new life was opening up before the imaginations of the people of Europe, the narrow bounds of stereotype and conventional thought were being forced in all directions. Luther was fighting for greater freedom of thought in religious belief, Titian was working at his art, Michael Angelo at his stone, Shakespeare about to be born, Valesquez about to commence his painting. In France it was the time of Francois Premier, that most picturesque period of art and manners in that country of good manners and good art and a century later Inigo Jones and Christopher Wren were in England to add their quota, to the sum total of that talent that started and sustained this Great Period of the Renaissance, lasting let us say from the close of the fifteenth to the end of the seventeenth century. In this free and unregulated expression of poetic fancy Mexican architecture presents itself to us in a never ceasing chain of interest. In order to show you some of the premises on which I make this claim of good architecture for Mexico I have tried to indicate to you something of the qualities of those men and times whose lives and manners are the index of that brilliant period known as the Renaissance—Luther, Titian, Michael Angelo, Valesquez, Benvenuto Cellini, Murillo, Shakespeare, Cervantes and many others. Now while these invaded the field of art, literature and freedom of thought, extending their boundaries, Columbus had bridged the Atlantic and following quickly in his steps Cortez, the Spaniard, set out to discover and shortly to complete his conquest of New Spain, or Old Mexico.

---

* Paper read and illustrated before the San Francisco Architectural Club. This paper will be concluded in the March Architect and Engineer.

In 1520, Cortez landed at what is now the gulf port of Vera Cruz and commenced his march towards Tenahutla, the ancient capital of the Aztecs, now known as the City of Mexico, and in the space of a few months, after some vicissitudes, and defeats, subjugated this ancient and barbaric people. Now while the architecture of Mexico is distinctly Spanish, it would not be fair to the Aztec to say that there is no shadow of his image appearing in the work.

It is but the shadow, yet we cannot but feel that together with the wild romantic character of the country, its serene and beautiful climate, the qualities both artistic and intellectual of this interesting though barbaric people influenced the Spaniard and introduced a quality into his work that added rather than detracted from its interest.

It was impossible to live among so forceful a people without being affected by them, and in the execution of the work, which was done largely by Aztec labor, their conceptions of art in the matter of detail certainly modified the lines as laid down by the Spaniard. Very little is left of Aztec architecture to show to modern times their capacity in this respect but of what is left, we may infer that at some period lying between the dawn of history and the conquest they had developed a civilization not far behind that of the ancient Egyptian. At all events it would be a mistake to underestimate the qualities of these people barbaric though they were, and if we are to place any historical value upon the description of the Court of Montezuma at the time of the conquest as given by Lew Wallace in his "Fair God" we are compelled to admit that in barbaric splendor exhibiting a perception of art, and a knowledge and love of the beautiful, the Aztec people were in no way deficient, and from the fact that in later years Juares, an Aztec, rose to be president of the republic, and that Cortez took to wife the daughter of Montezuma, we are assured that the Aztec were a people of some quality and capacity.

In 1520, Cortez landed and following rapidly in his train, from Spain came soldiers, governors, artisans, priests and merchants. Reared in the cradle of the Renaissance, learned in the art of building and decorating, carrying with them still some fragment of the mantle of the Moor and inspired by the acquisition of a new and romantic country, and fired by religious zeal, they commenced the building of Spanish Mexico.

I would also like to point out to you that in all historic times great architecture has always been religious architecture. This is easily accounted for, from the fact that it does not matter how defective a religion may be, it always represents the loftiest ideals of a people and their time. It is that seeking after an ideality, raising the mind above the humbler and commercial pursuits of life and those baser strivings that dull the imagination, and lifting it into the region of that city beautiful, where art and architecture and all things most to be desired are to be found. It was a religious period in Mexico, a beautiful period that ran its course from the beginning of the sixteenth to the end of the eighteenth century. Cities were well laid out, with plazas, alamedas, gardens, fountains, shrines, and so forth. The plaza in all Mexican cities is the civic center. Here congregate the important public buildings, framing the beauty of the foliage, while in turn the open spaces give the opportunity to appreciate the architecture of the buildings.

Talking of civic centers, one may say that all American cities, save perhaps Washington, have been laid out without any regard to beauty. The cows, as I understand it, laid out Boston and in that way gave it interest, but in most of our cities utility so called, taking no account of beauty, has and even to this day inspires the plan. We have no one to regulate these things, and the real estate agent and land-owner, thinking of the number of lots he can divide his ground into furnish the lines for succeeding generations.

The surveyor, equally devoid of a sense of beauty, supplies the required carefully figured parallelograms and triangles, but no conception of a city as an entity with center and sides enters their imaginations. Not so in Mexico. All cities, even villages, have a civic center with, in some cases, subsidiary centers. These points placed at suitable intervals, break the monotony of straight lines and punctuate what, if not stopped in time, becomes an unsatisfied vista.

With us we place the public park away out on the borders of the country, just the place it is not wanted, or least wanted, for it is to retain something of the country in our midst that we require foliage or flowers at all and so on the verge of the country, parks are least required, but in the center of a city, parks and breathing spaces become the natural complement to the crowding of habitations.

The more the crowding of buildings the more necessary both from the point of view of health and beauty become the embowered open spaces, the eye weary of art turns with fresh delight to nature, and again refreshed by nature turns with quickening perception to art, and so the one enhances the value of the other.

The Mexican plazas, gardens and alamedas are all laid out with taste, concentrating within the narrow boundaries prescribed as much of interest as the space will allow; not dropping, as it were, a piece of rough forest land into the midst of houses, but providing a well and fully designed garden, an Italian garden, elaborated into many points of interest.

* * *

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"Why do you call it automobile stuff?" asked the proprietor.

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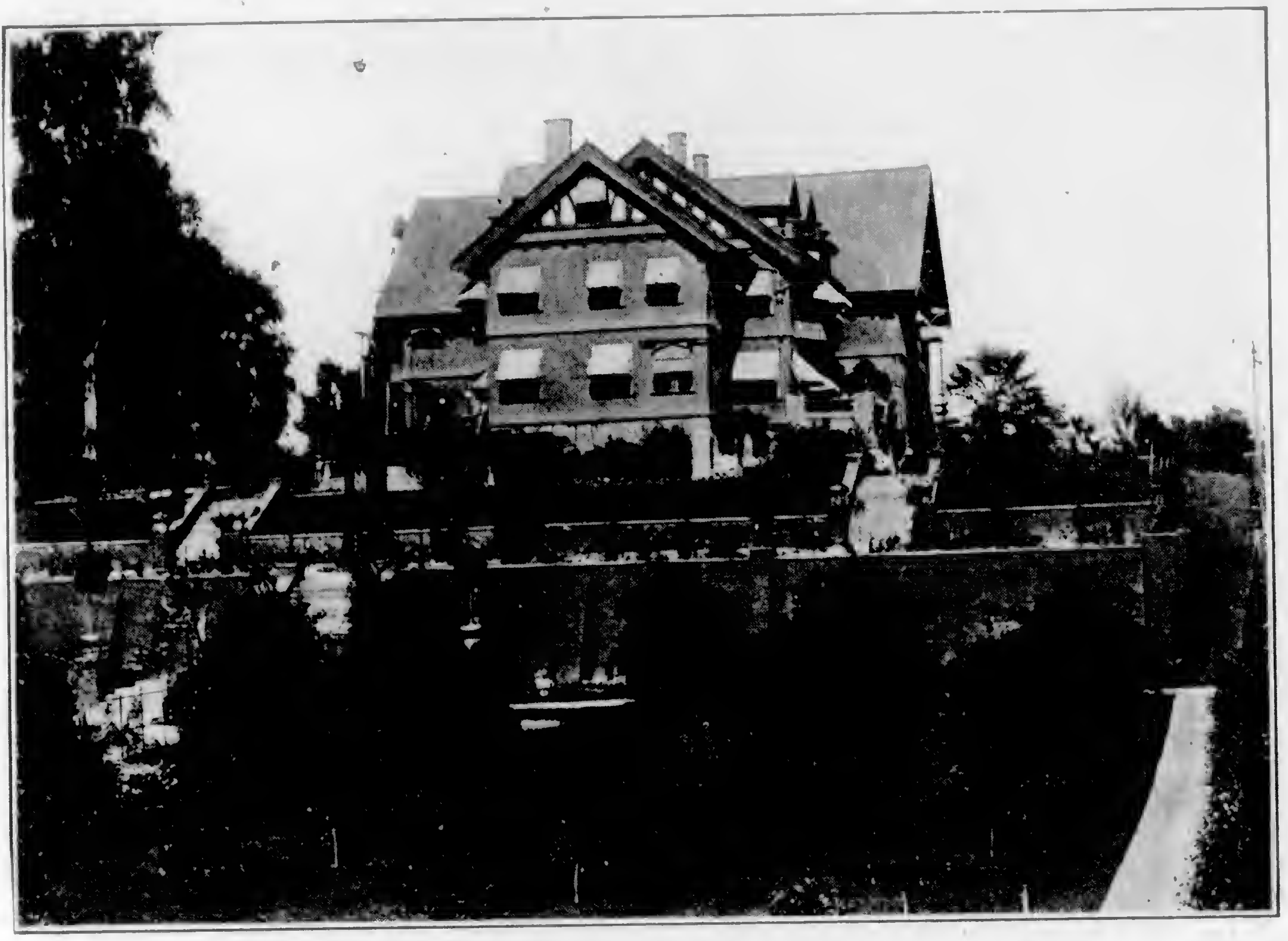


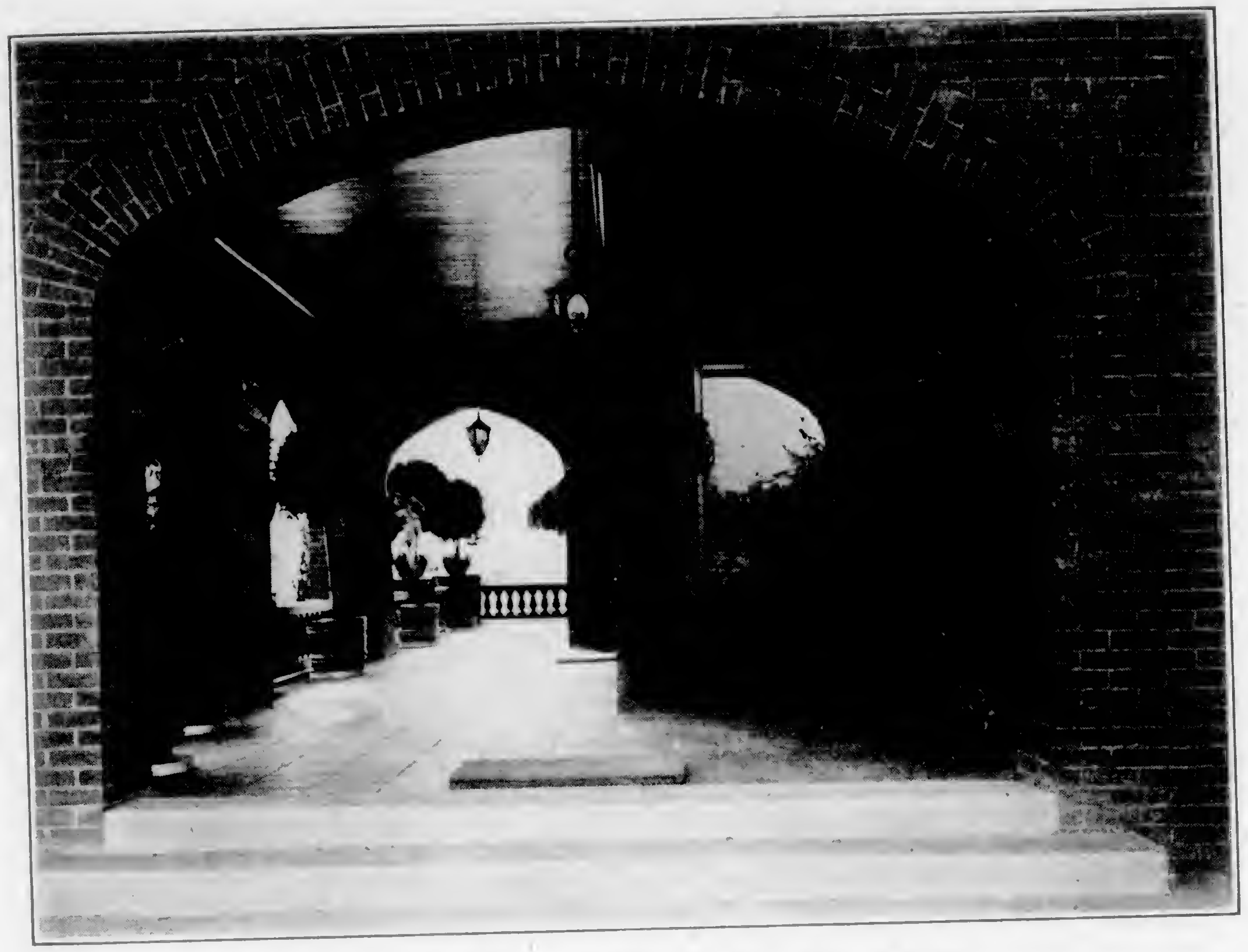
Residence of Mrs. Geo. W. Childs, Pasadena
C. W. Buchanan, Architect

Some California Architecture as Seen in the Work of C. W. Buchanan, Architect

THAT C. W. Buchanan has been closely identified with the growth and upbuilding of Pasadena is evidenced by the many fine residences and business buildings erected from his plans and under his supervision. The scope of his work runs from the picturesque bungalow to the palatial mansion, business and office buildings, and schools and churches.

Mr. Buchanan received his architectural education in the east, coming from Indianapolis in 1889 for the benefit of his health. Like so many others, the charms of Southern California captured him and he determined to make Pasadena his future home. His health recovered, he again took up his chosen profession, since which time he has been a factor in making the southern municipality known as it is the world over—"The City of Beautiful Homes."

Variety in architecture is the making of the City Beautiful. Location and its surroundings are important factors which the intelligent architect utilizes in planning a model home. He would seek to give an harmonious blending of art and nature. That this plan has been largely followed in the building of Pasadena is apparent to the visitor. The illustrations shown herewith are striking examples of Mr. Buchanan's work, ranging as they do from the old English to the truly distinctive California type—a style now being copied quite extensively all over the country.



Entrance Porch Residence of Mrs Geo. W. Childs Pasadena
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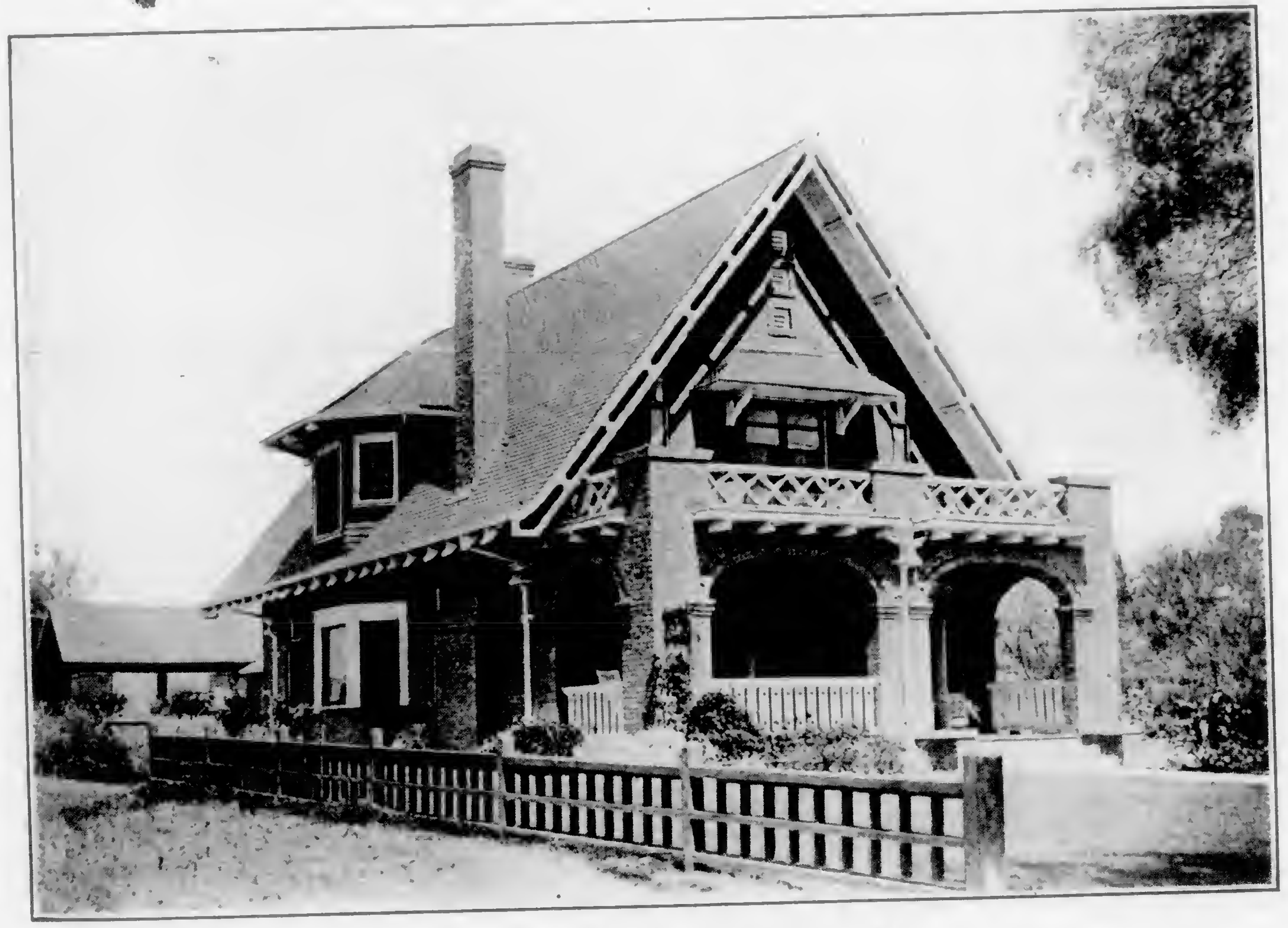
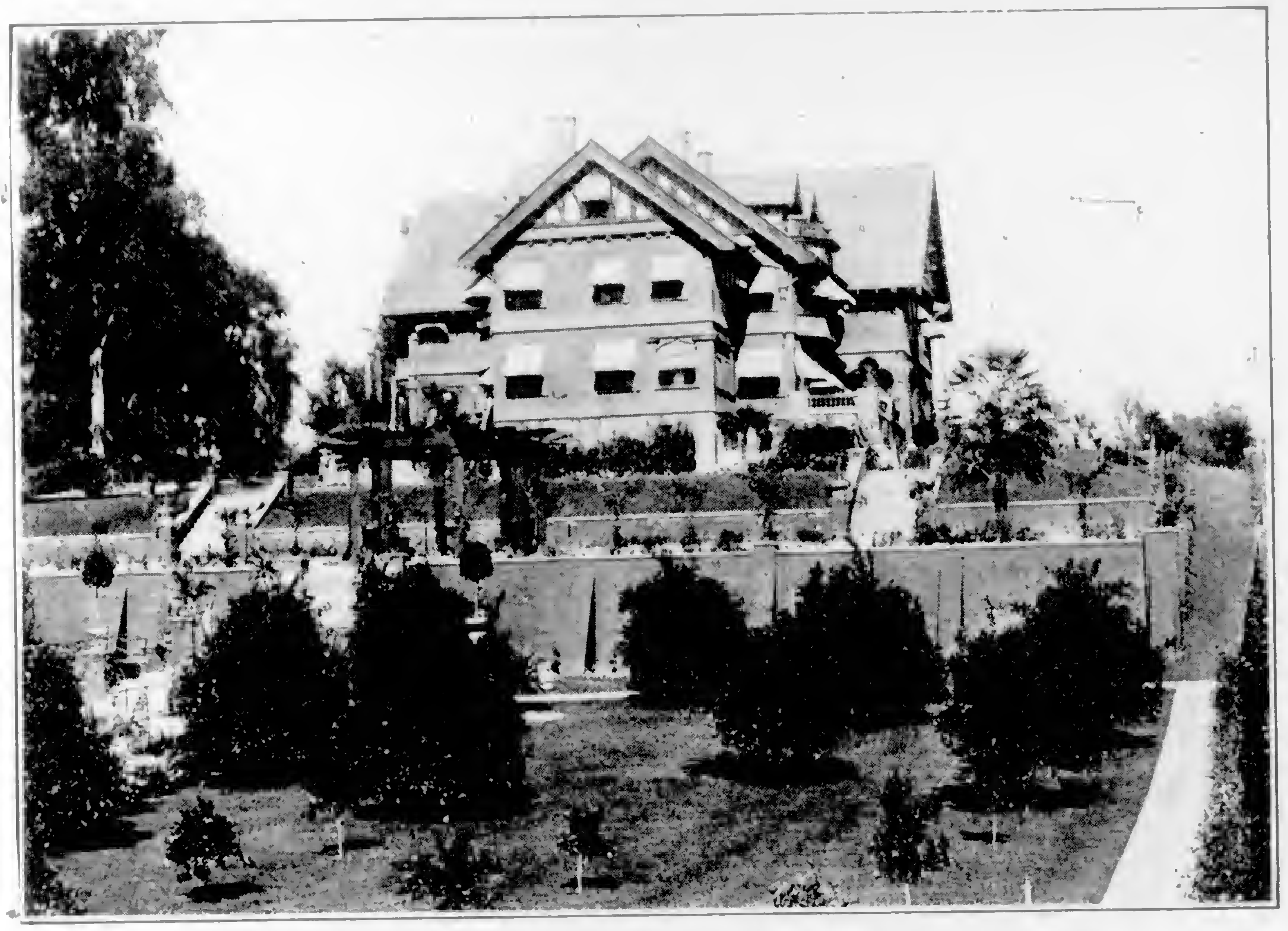


Brick House of Mr. R. Simons, Pasadena
C. W. Buchanan, Architect



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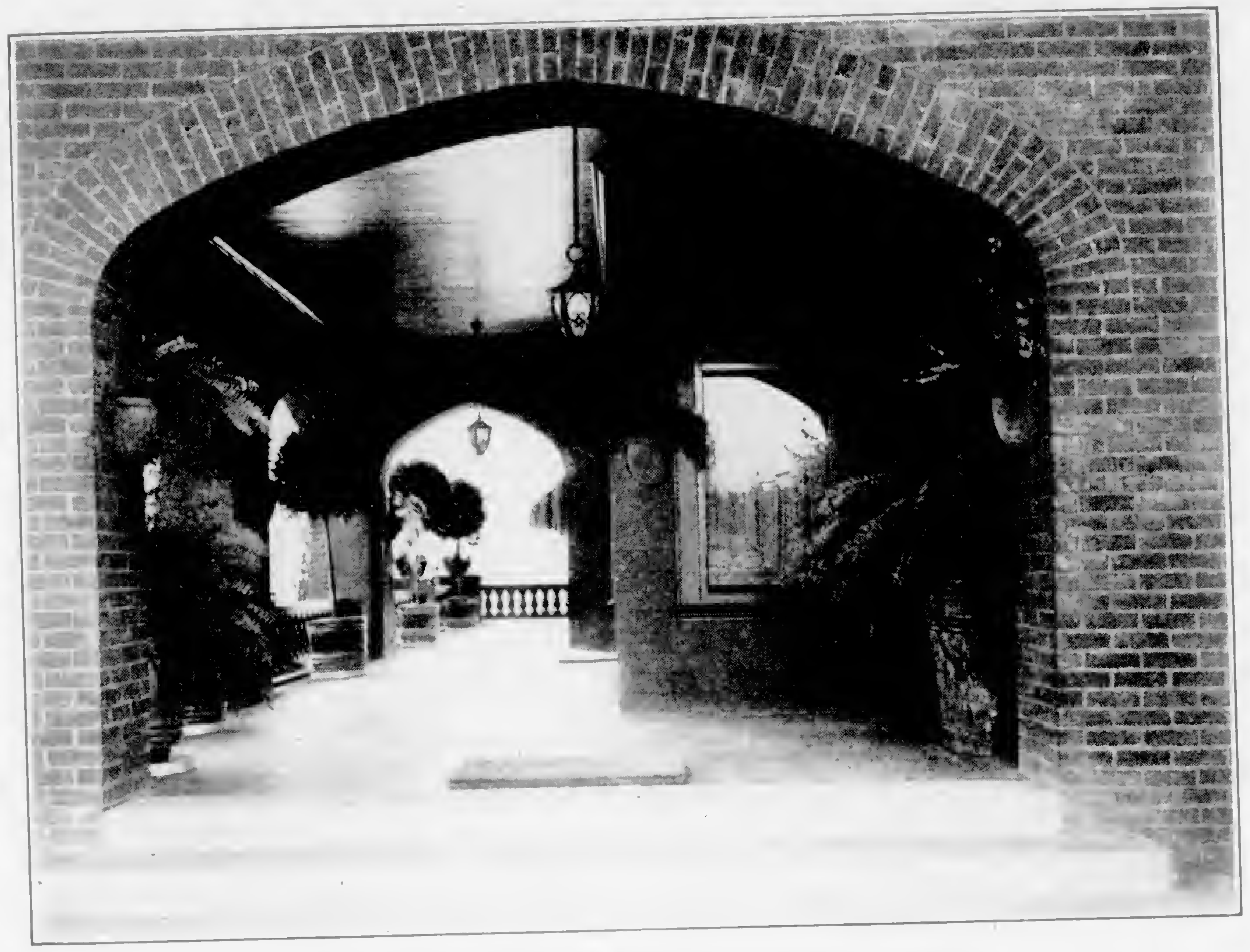
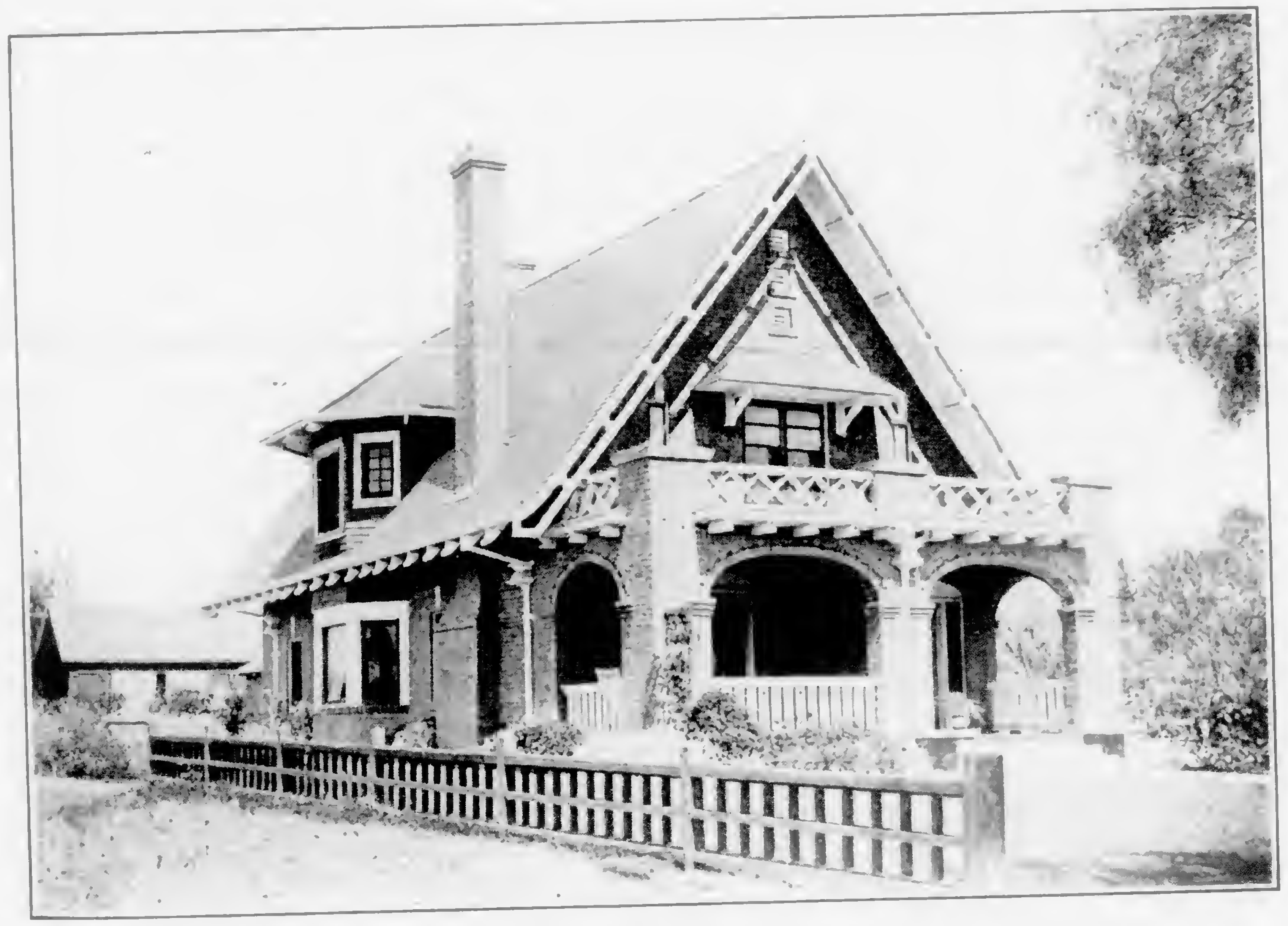
Mr. Buchanan received his architectural education in the east, coming from Indianapolis in 1889 for the benefit of his health. Like so many others, the charms of Southern California captured him and he determined to make Pasadena his future home. His health recovered, he again took up his chosen profession, since which time he has been a factor in making the southern municipality known as it is the world over—"The City of Beautiful Homes."

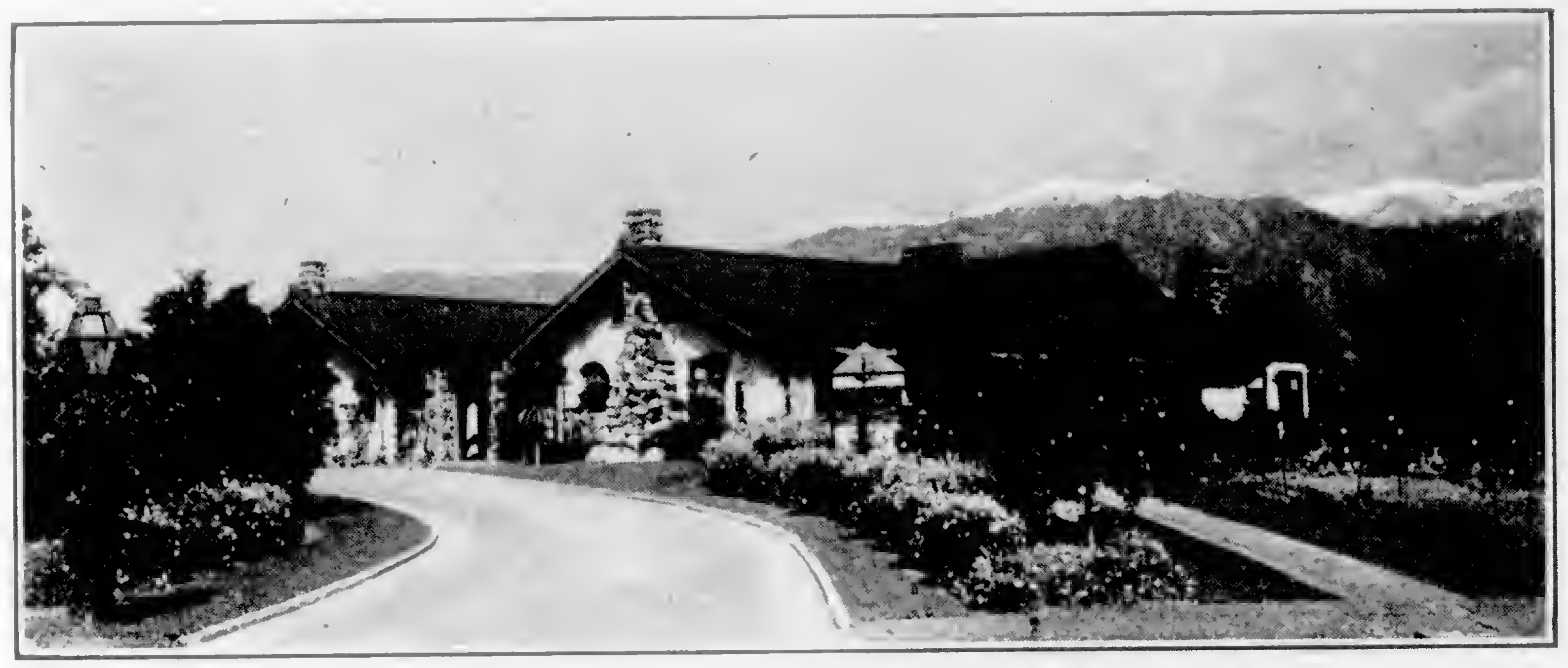
Variety in architecture is the making of the City Beautiful. Location and its surroundings are important factors which the intelligent architect utilizes in planning a model home. He would seek to give an harmonious blending of art and nature. That this plan has been largely followed in the building of Pasadena is apparent to the visitor. The illustrations shown herewith are striking examples of Mr. Buchanan's work, ranging as they do from the old English to the truly distinctive California type—a style now being copied quite extensively all over the country.



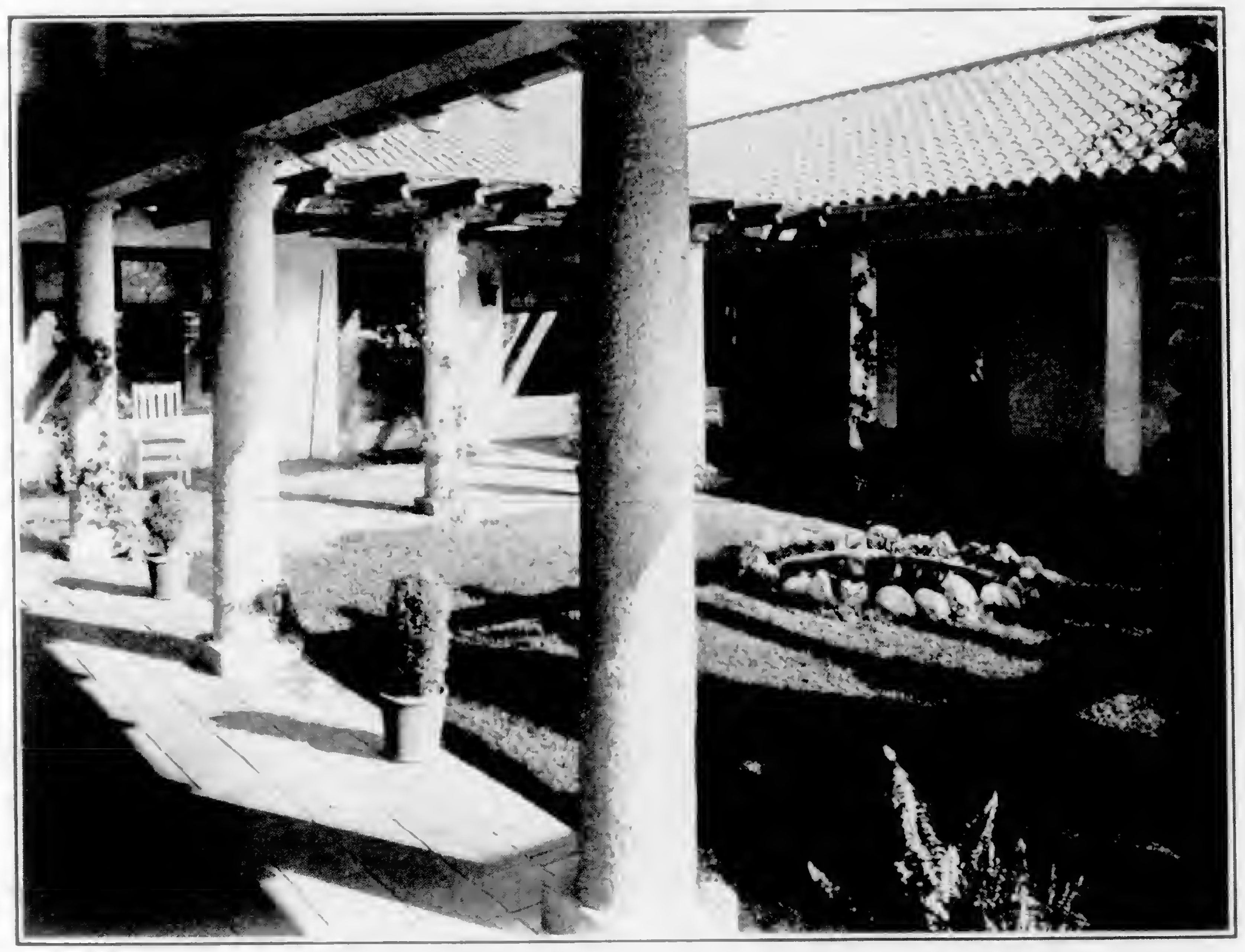
Entrance Porch Residence of Mrs Geo. W. Childs Pasadena
C. W. Buchanan, Architect



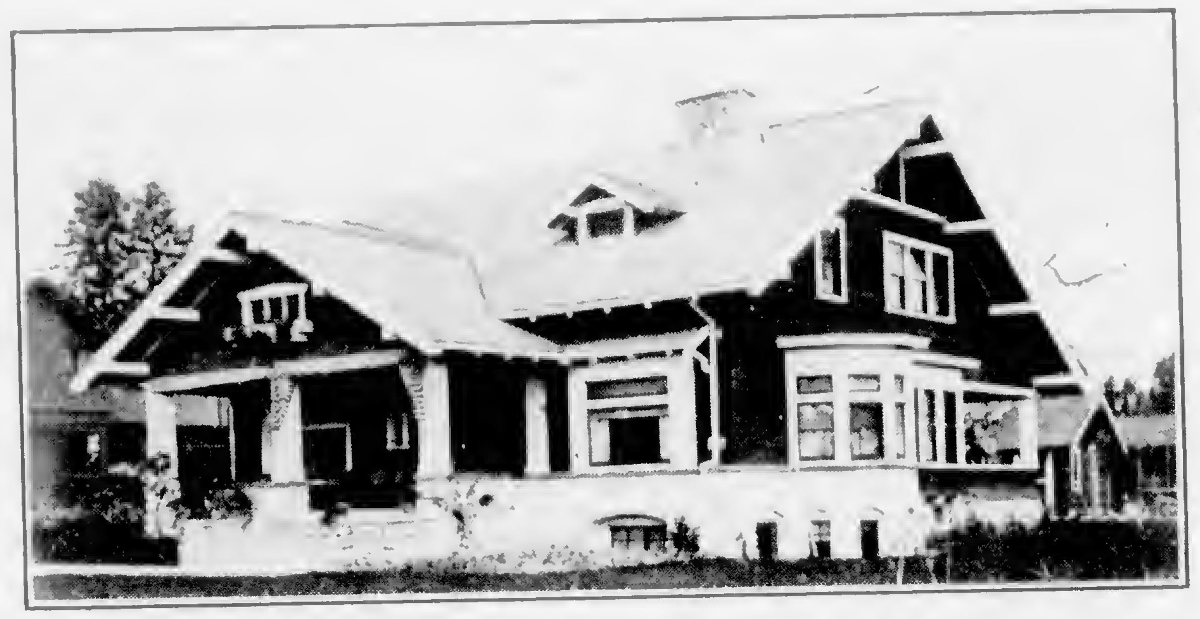
Brick House of Mr. R. Simons, Pasadena
C. W. Buchanan, Architect



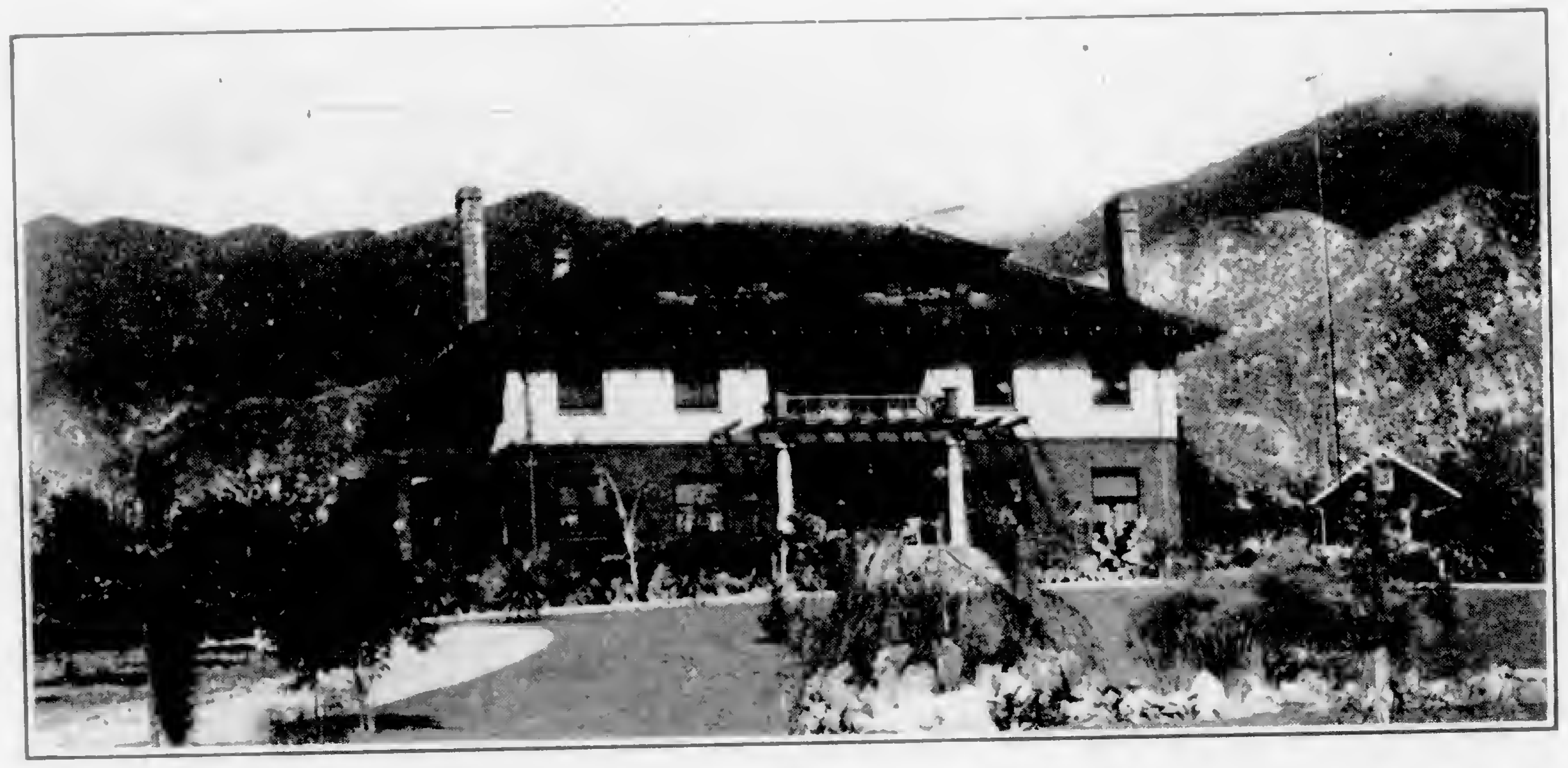
Bungalow for the San Pasqual Land Co., Pasadena
C. W. Buchanan, Architect



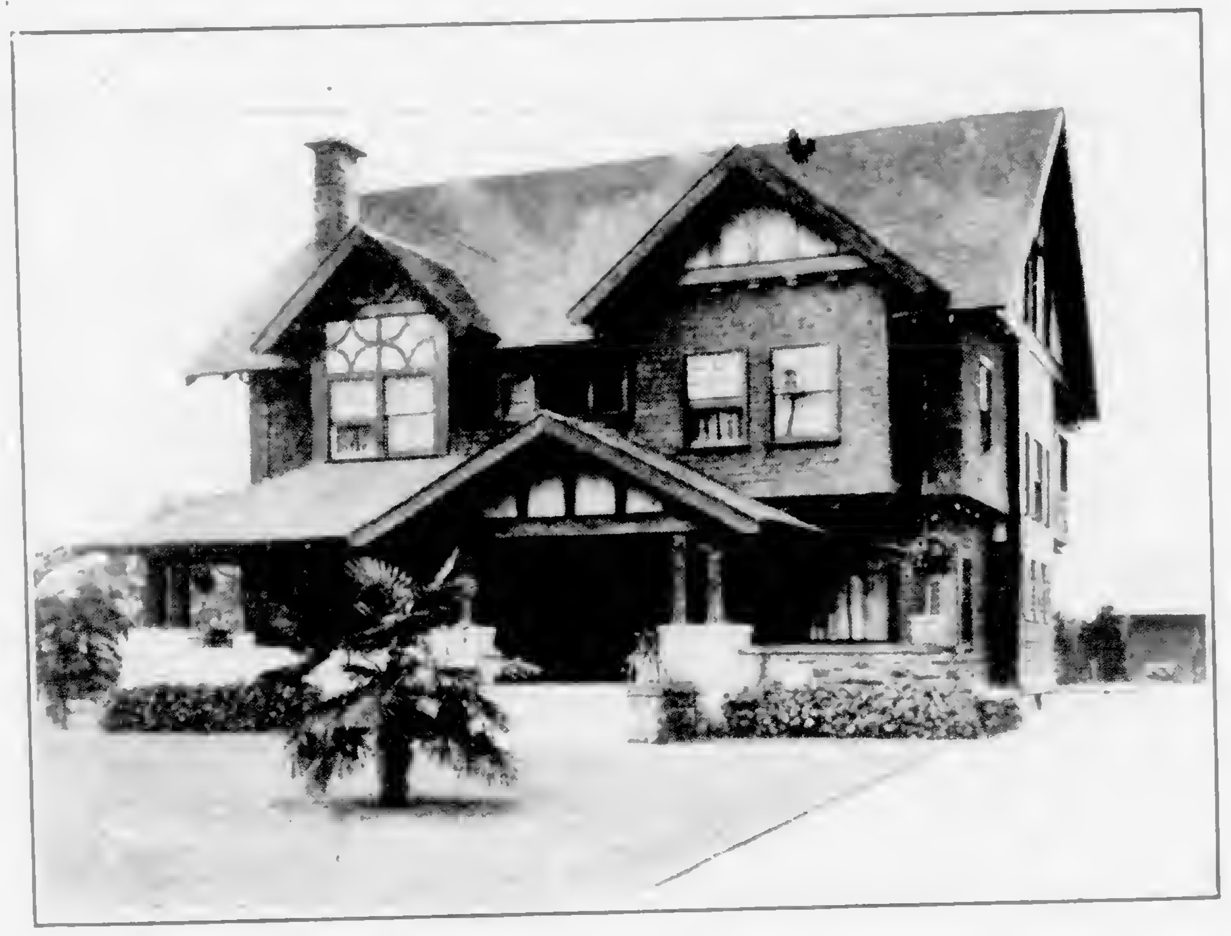
Bungalow for the San Pasqual Land Co., Pasadena
Interior of Patio *C. W. Buchanan, Architect*



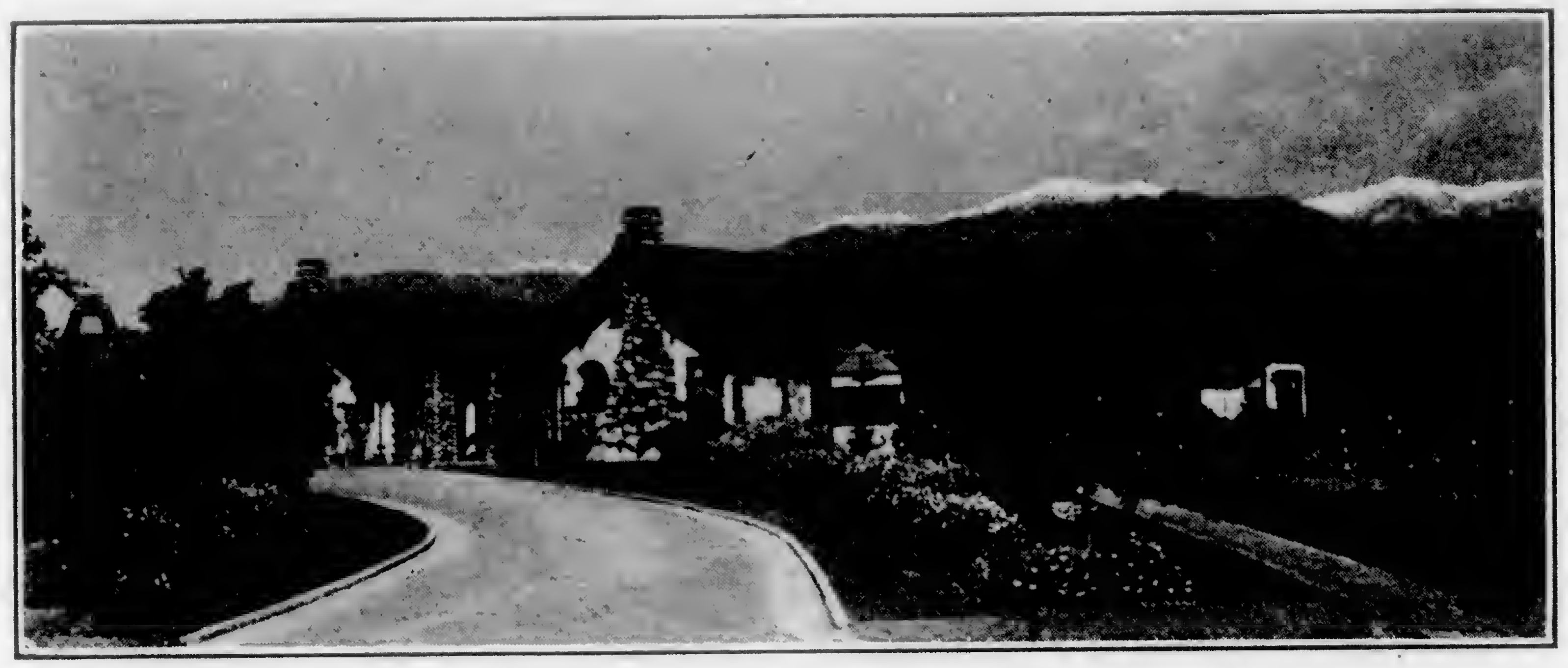
House of Mrs. W. R. Barnes, Pasadena
C. W. Buchanan, Architect



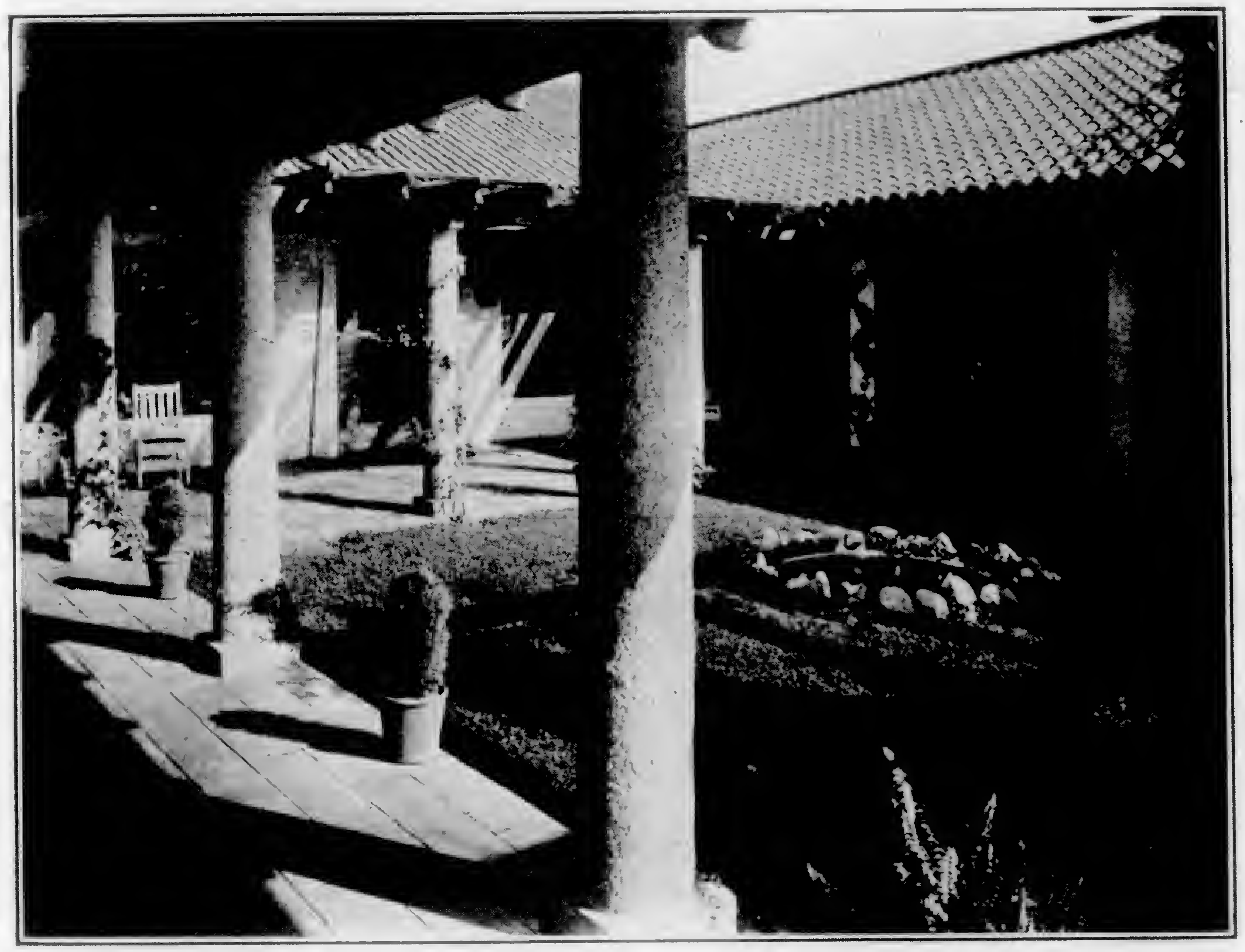
House of Mr. W. A. Scripps, near Pasadena
C. W. Buchanan, Architect



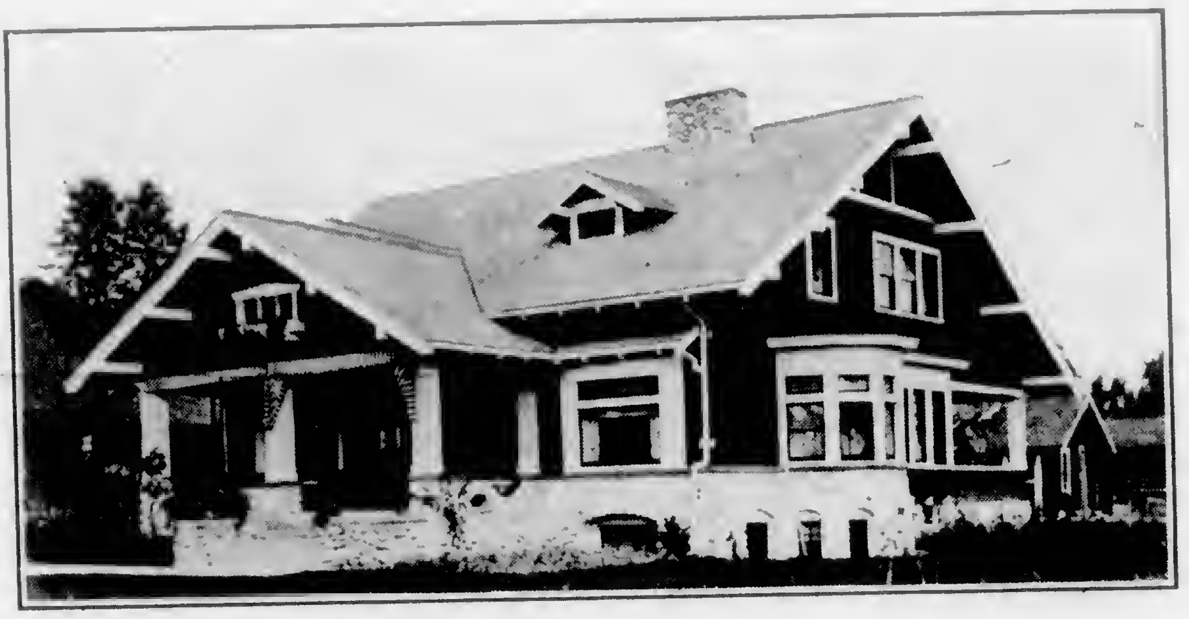
House of Mr. Frank Dale, Pasadena
C. W. Buchanan, Architect



Bungalow for the San Pasqual Land Co., Pasadena
C. W. Buchanan, Architect



Bungalow for the San Pasqual Land Co., Pasadena
Interior of Patio *C. W. Buchanan, Architect*



House of Mrs. W. R. Barnes, Pasadena
C. W. Buchanan, Architect

House of Mr. W. A. Scripps, near Pasadena
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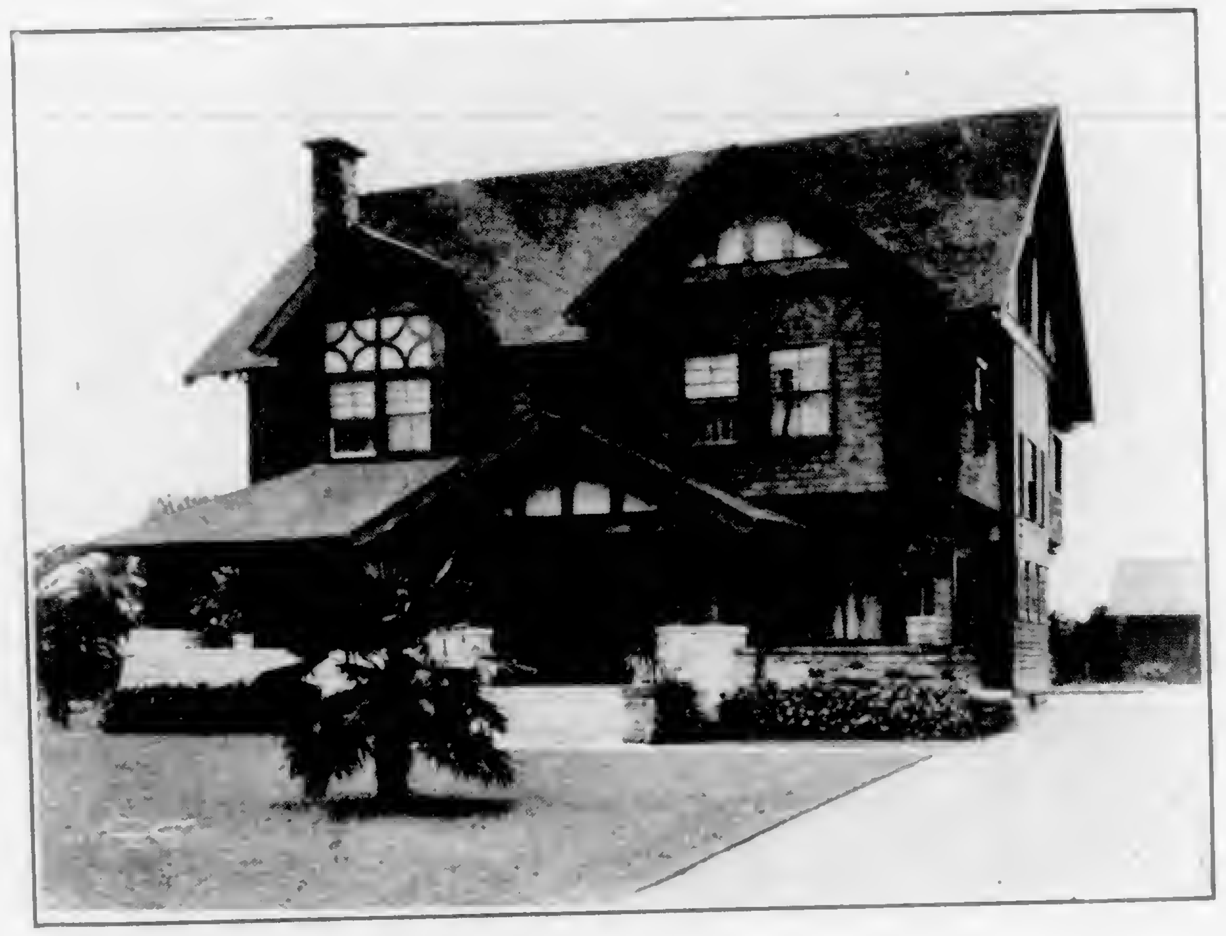
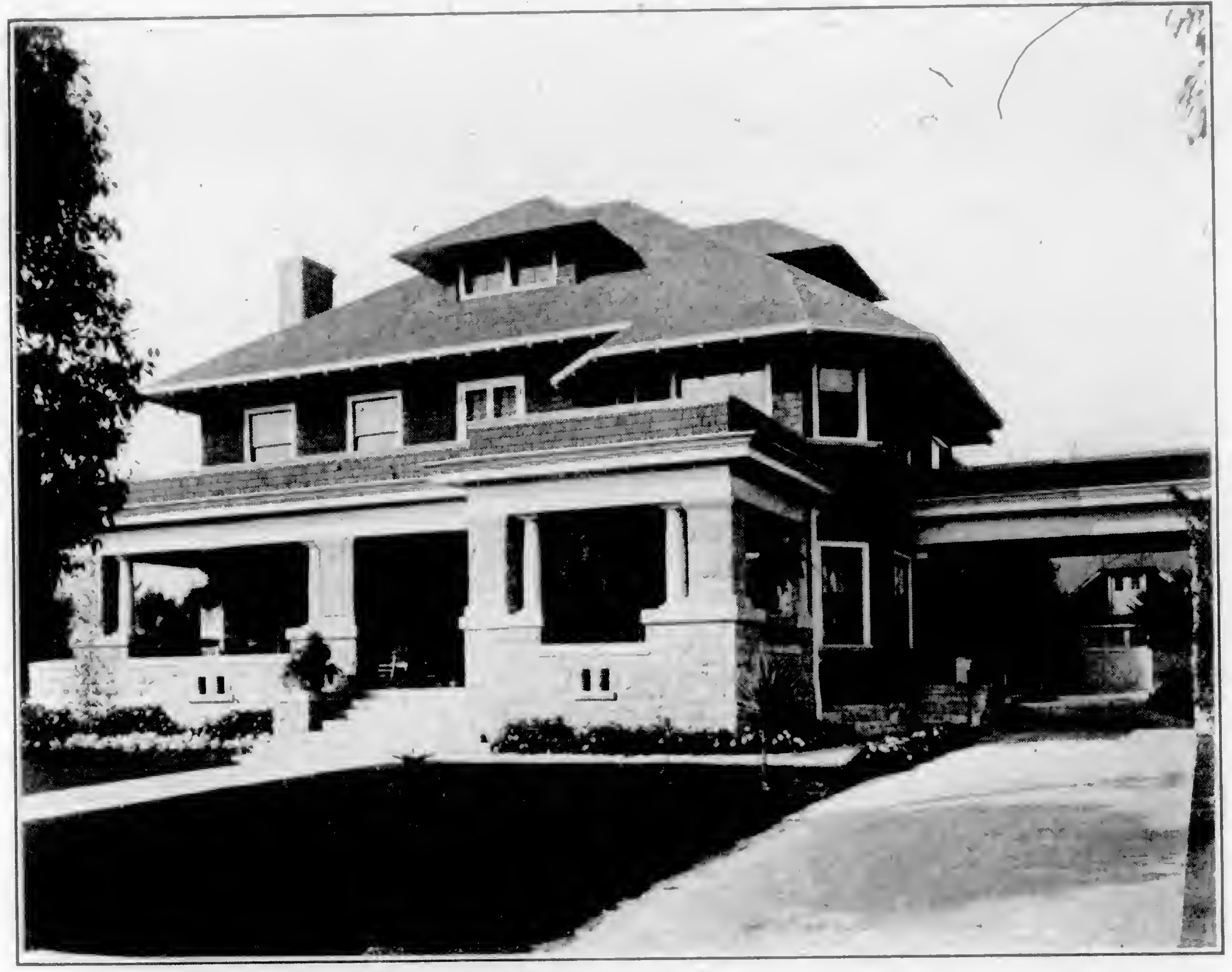
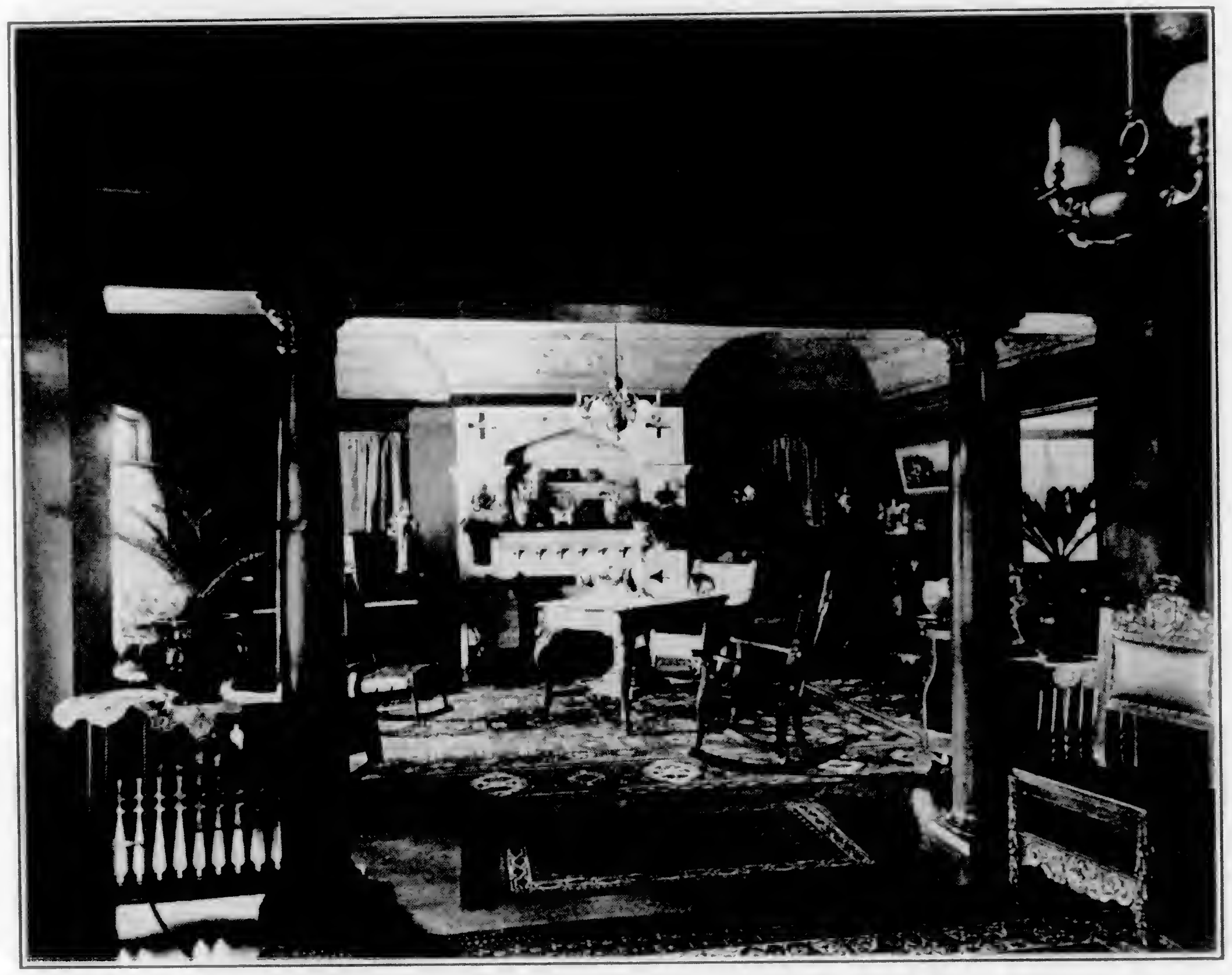


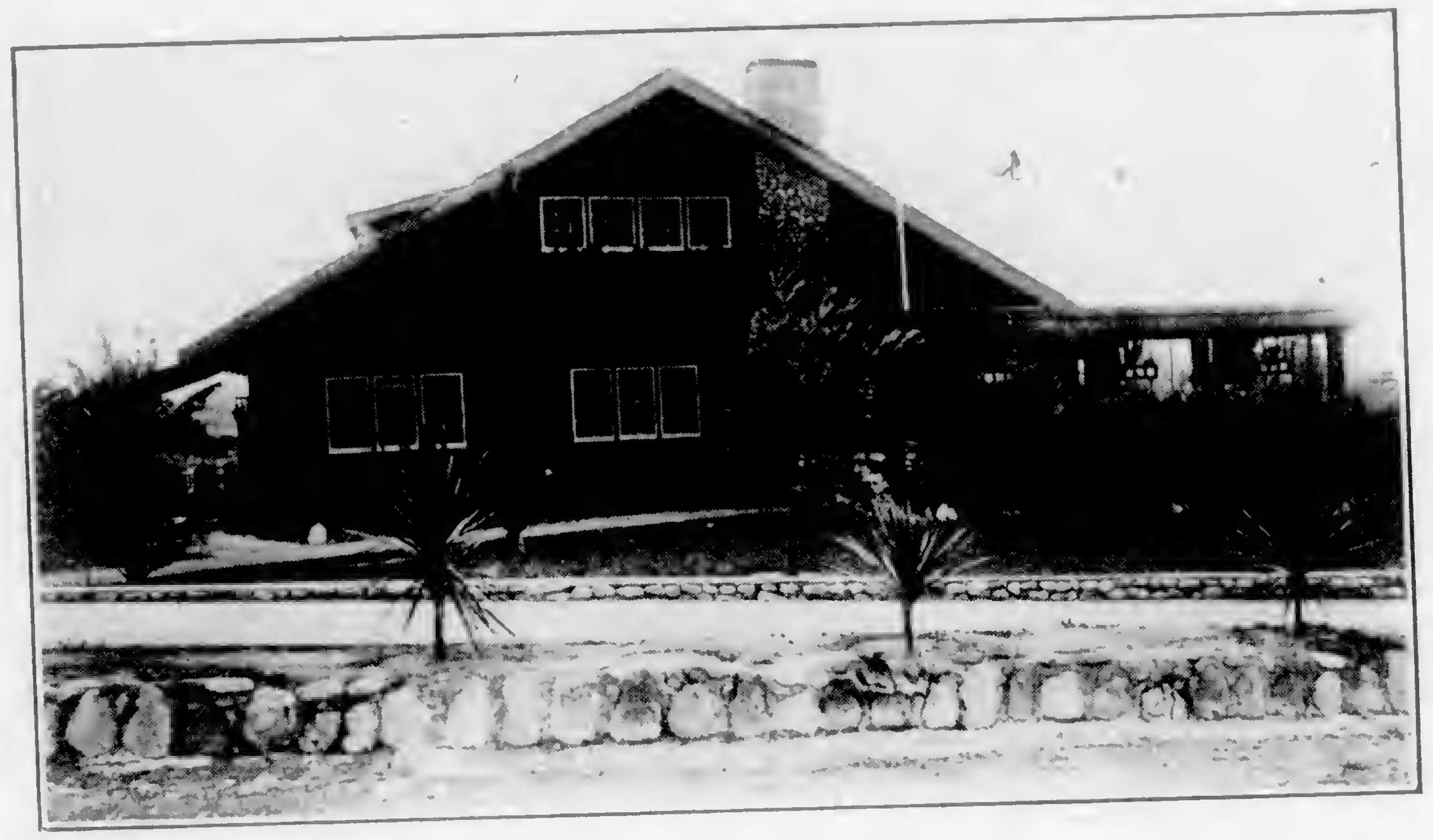
House of Mr. Frank Dale, Pasadena
C. W. Buchanan, Architect



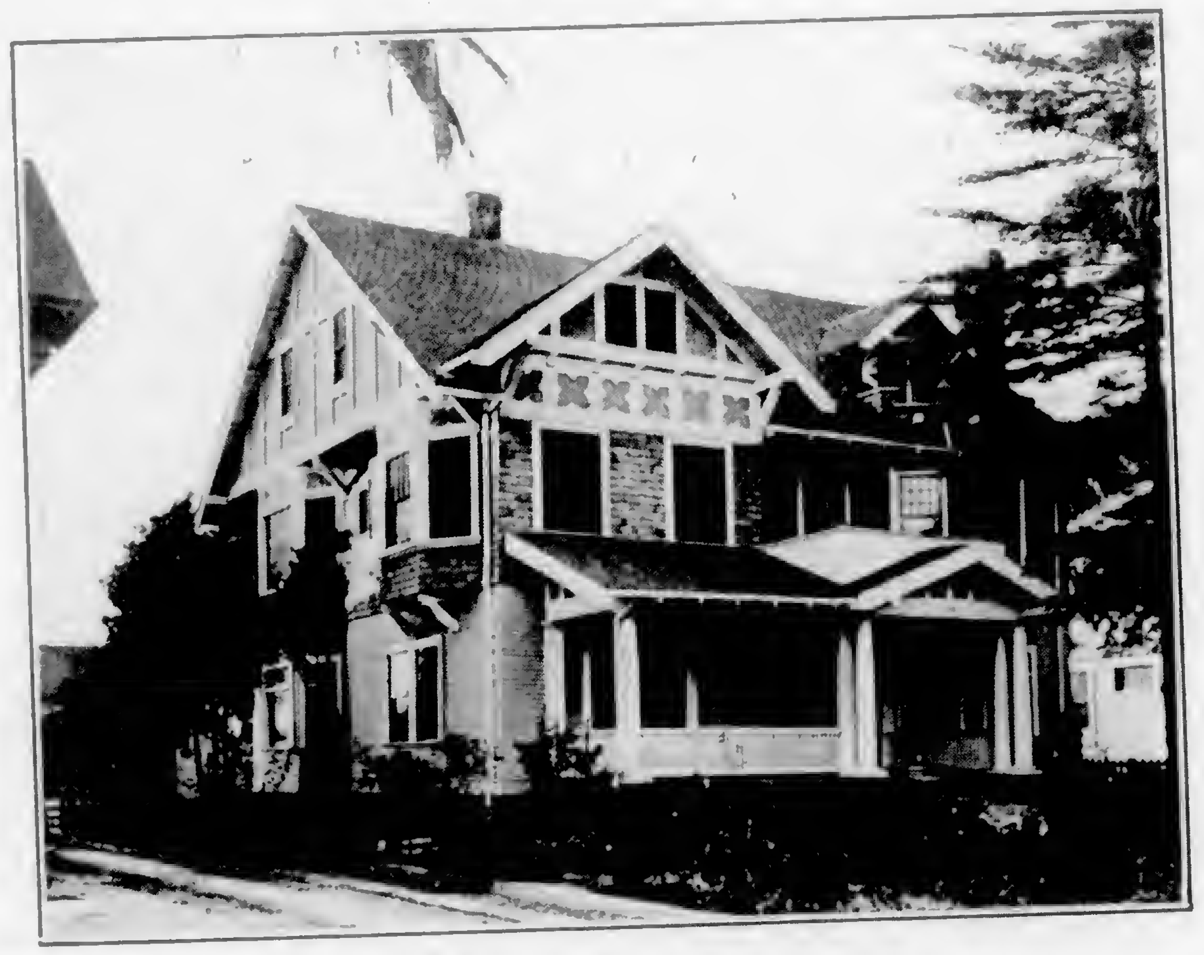
Residence of Mrs. J. O. Seibert, Pasadena C. W. Buchanan, Architect



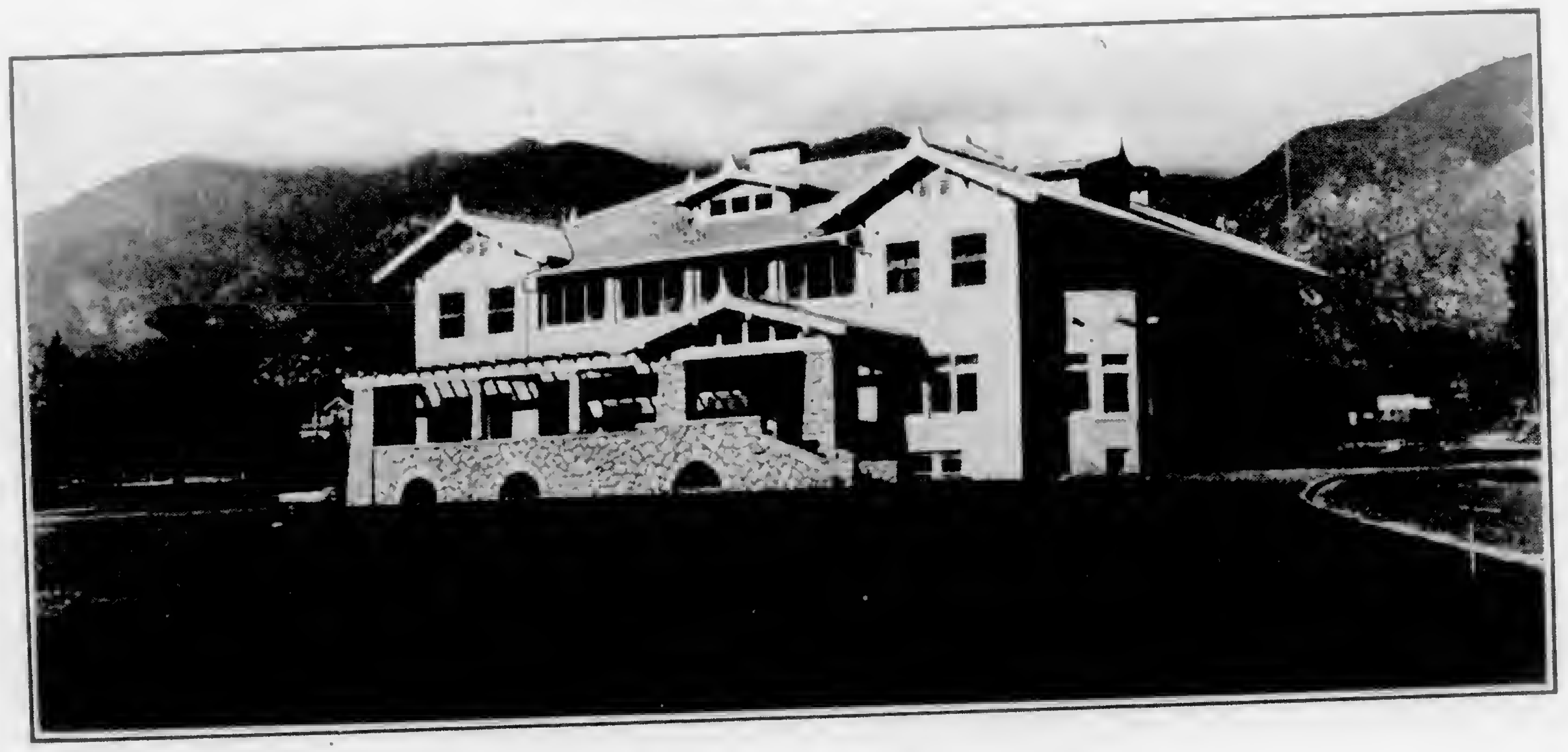
Interior, Residence of Mrs. J. O. Seibert, Pasadena C. W. Buchanan, Architect



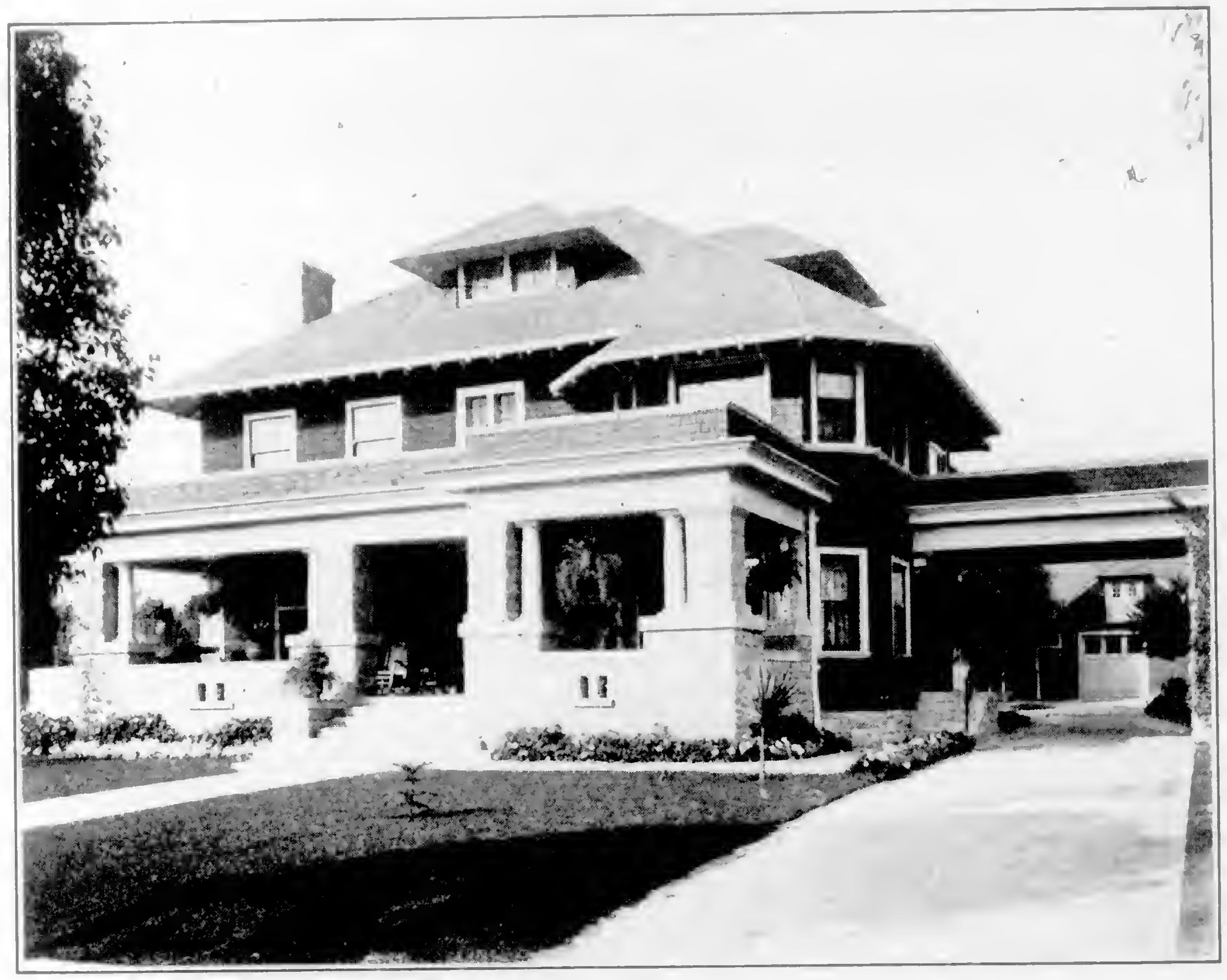
Residence of J. S. Glasscock, Pasadena
C. W. Buchanan, Architect



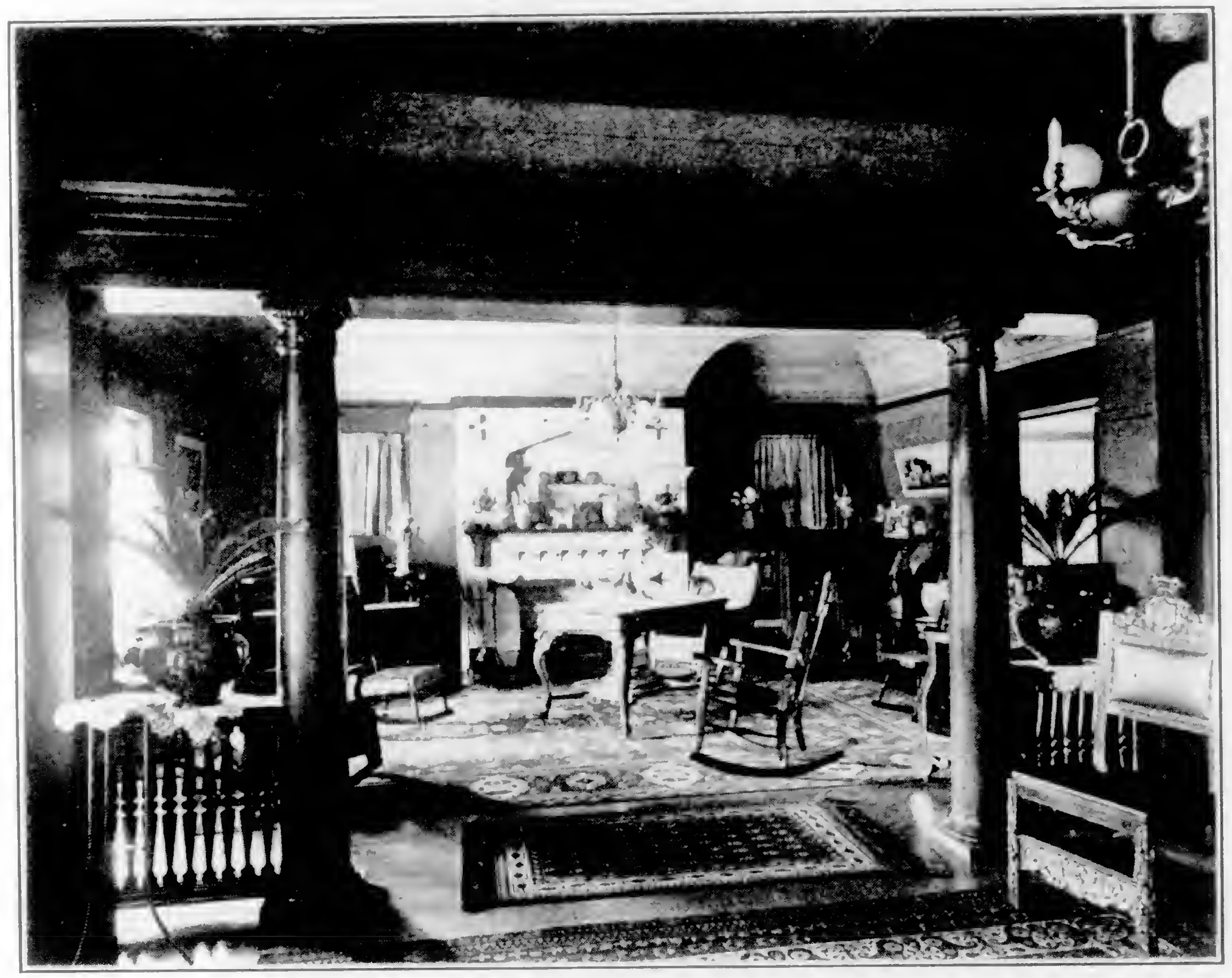
House of Mr. C. M. Emerick, Pasadena
C. W. Buchanan, Architect



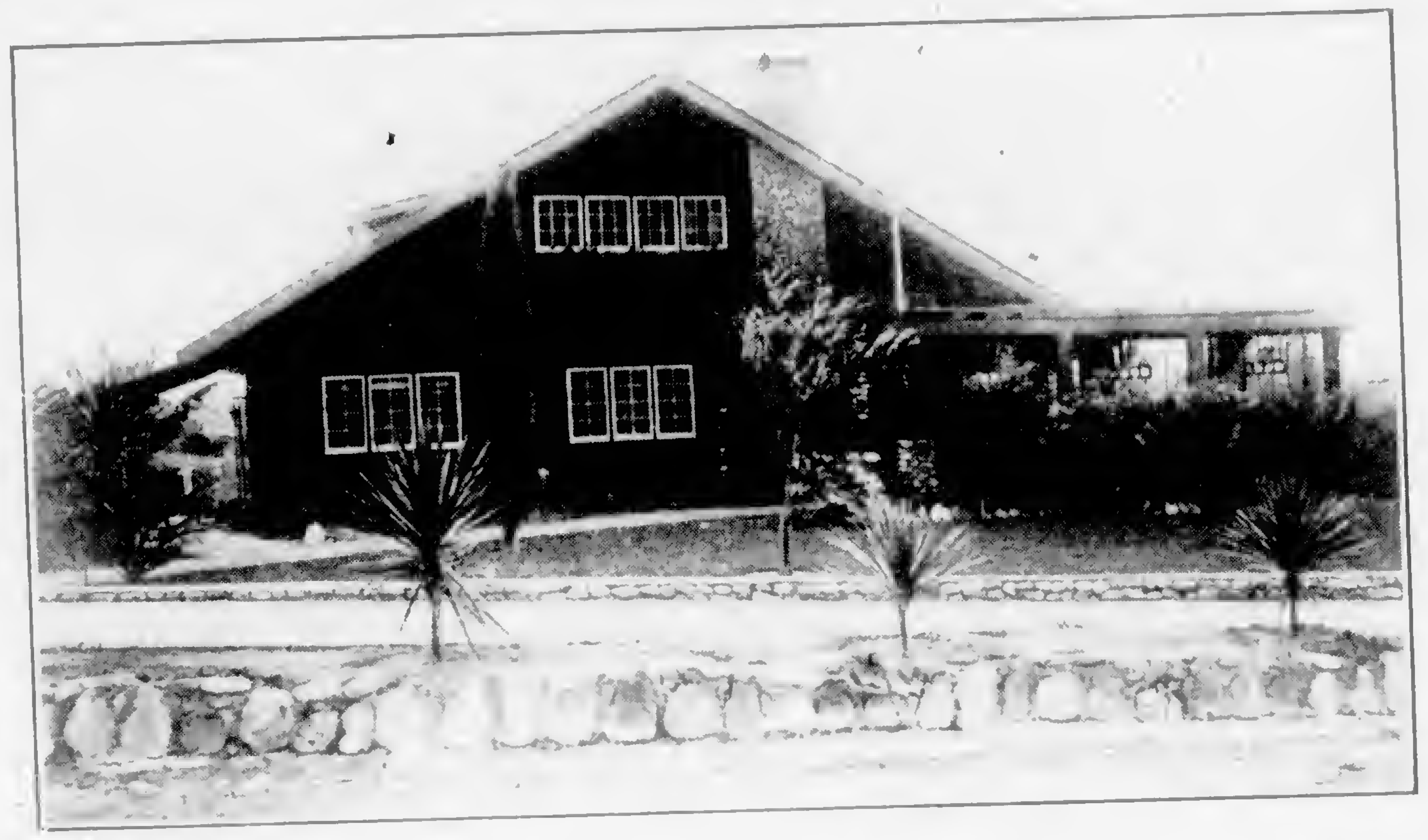
Altadena Residence of Mr. F. W. Kellogg
C. W. Buchanan, Architect



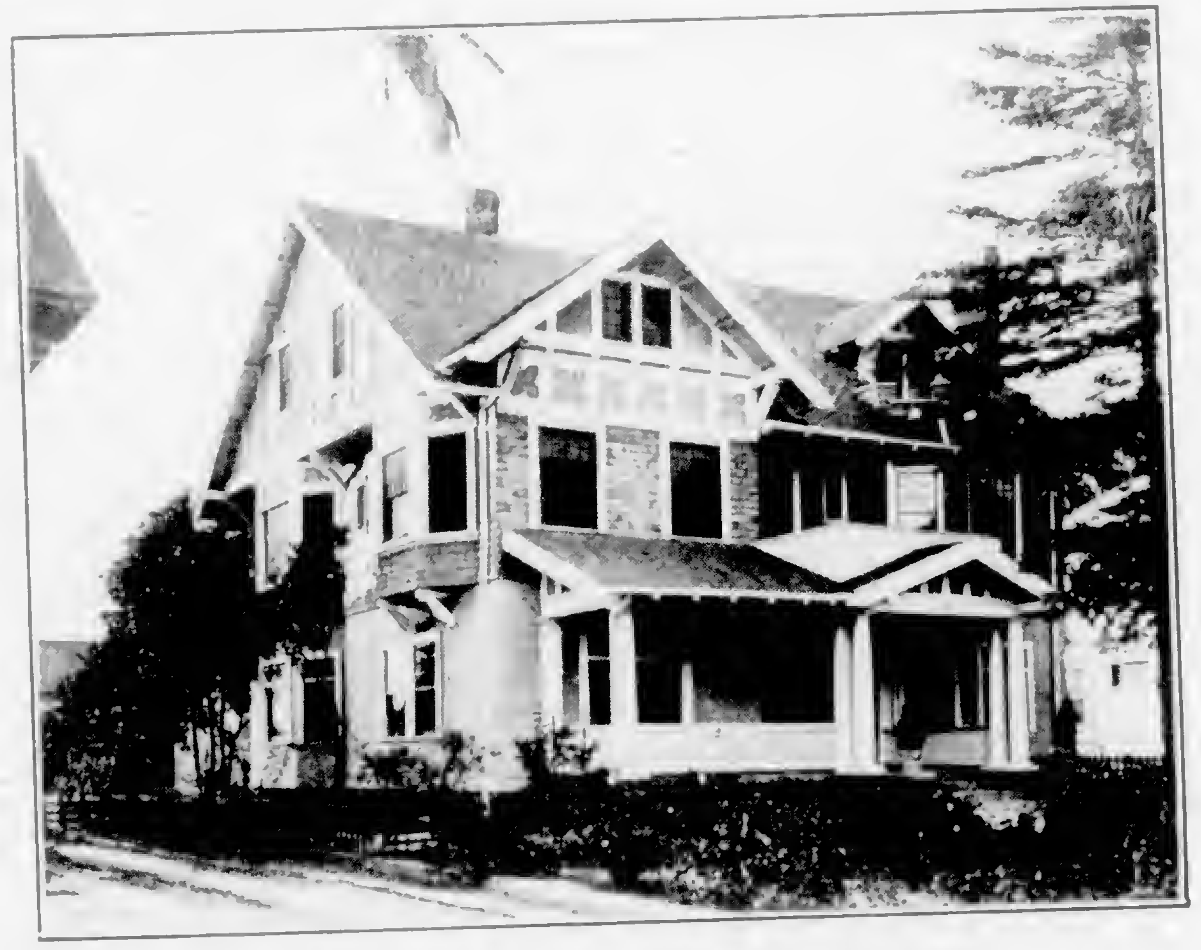
Residence of Mrs. J. O. Seibert, Pasadena   C. W. Buchanan, Architect



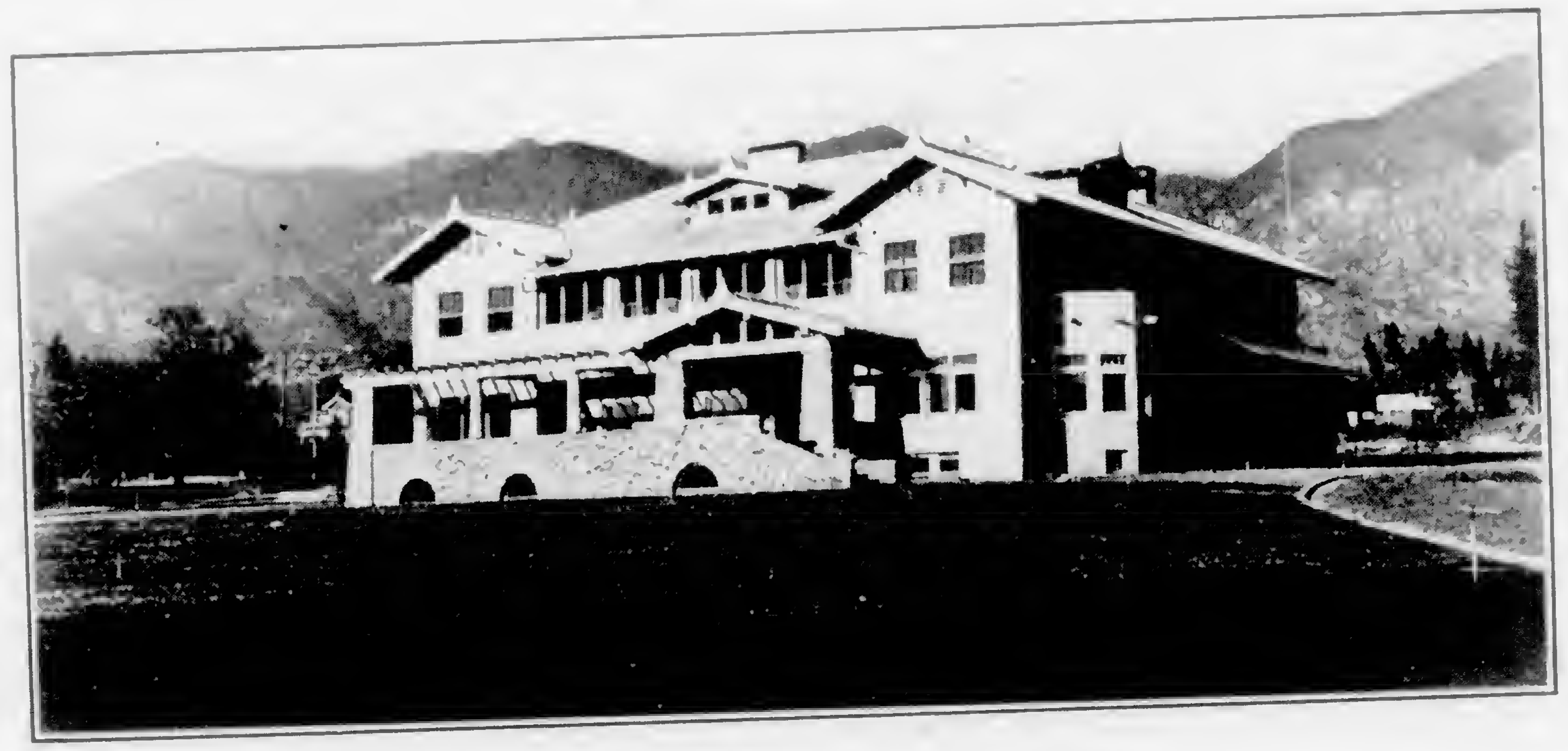
Interior Residence of Mrs. J. O. Seibert, Pasadena   C. W. Buchanan, Architect



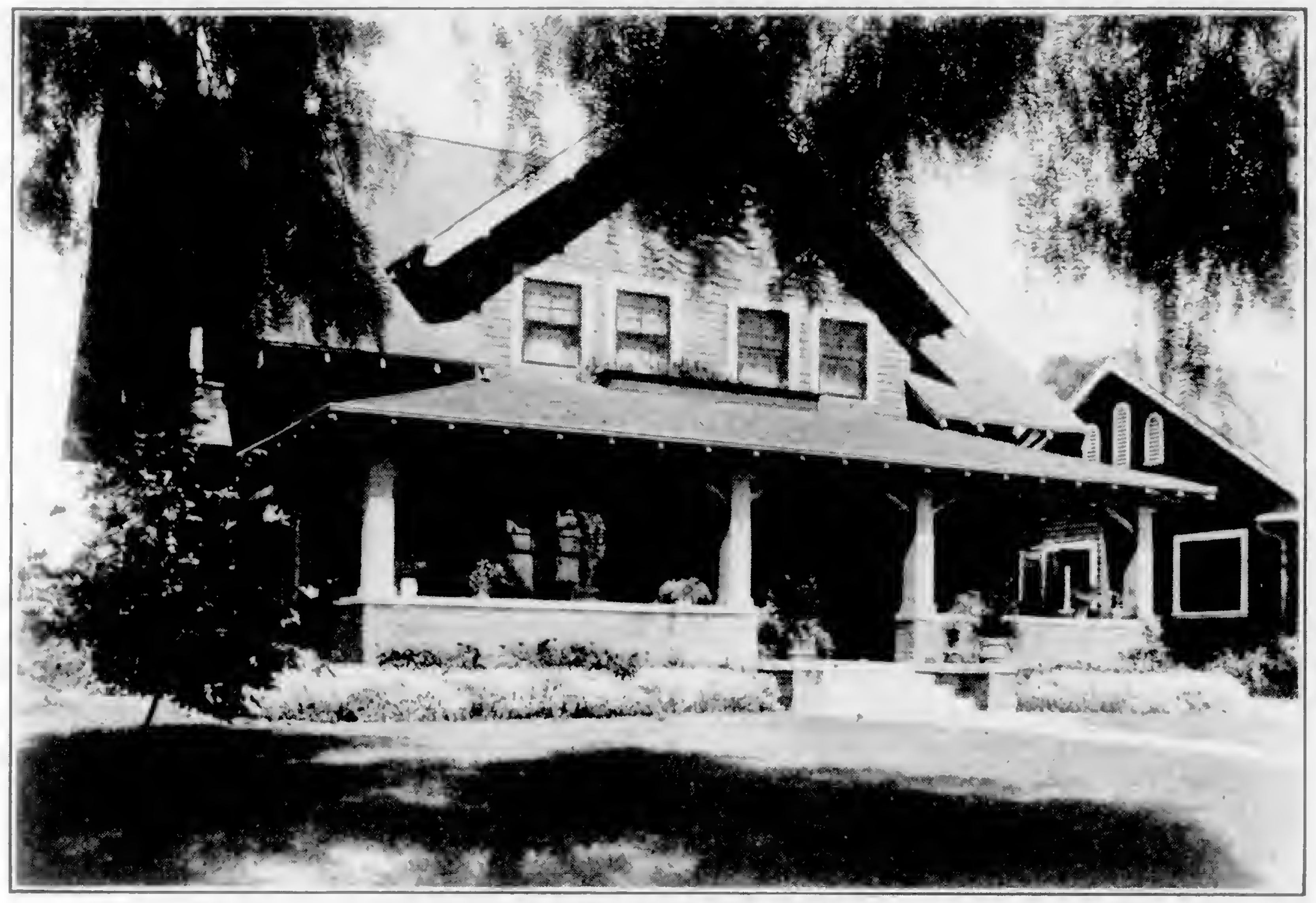
Residence of J. S. Glasscock, Pasadena
C. W. Buchanan, Architect



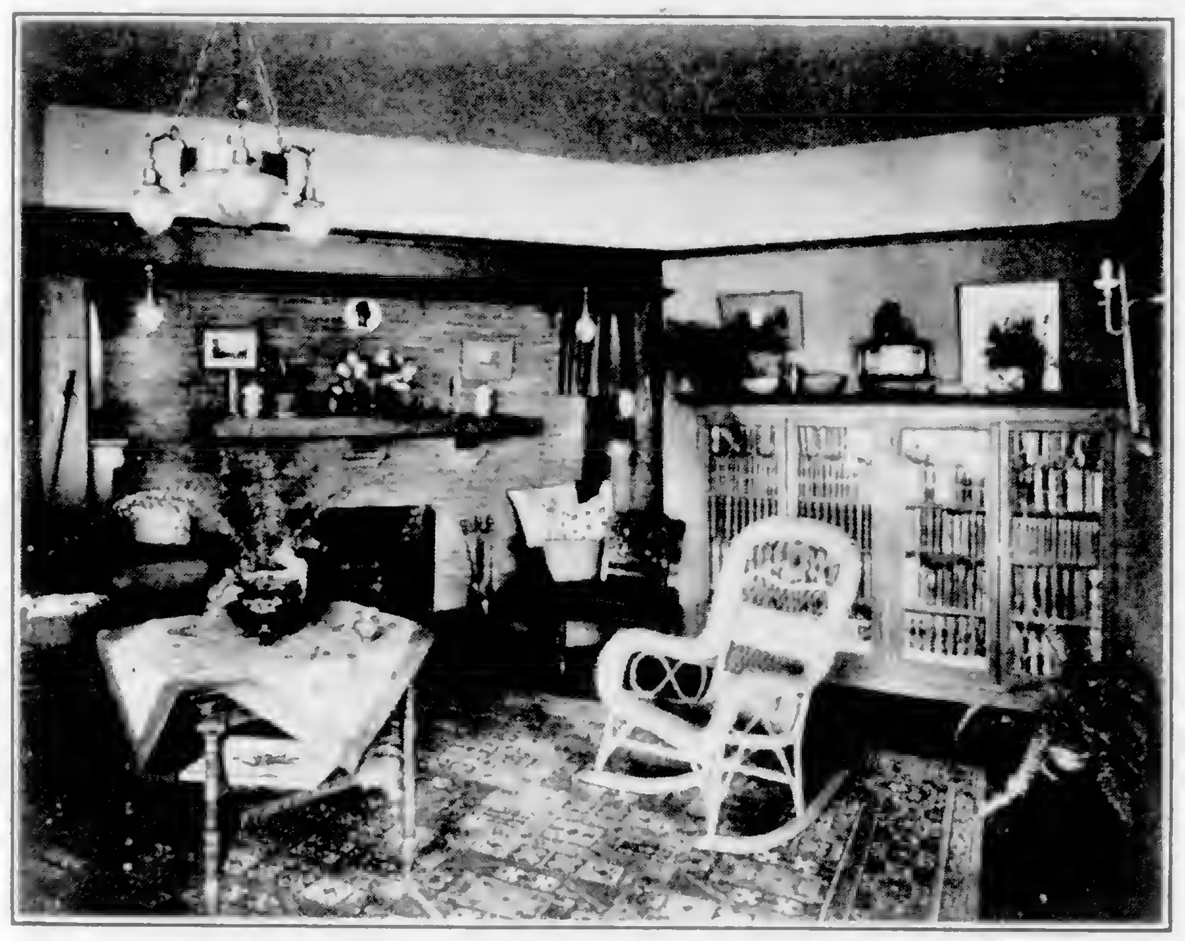
House of Mr. C. M. Emerick, Pasadena
C. W. Buchanan, Architect



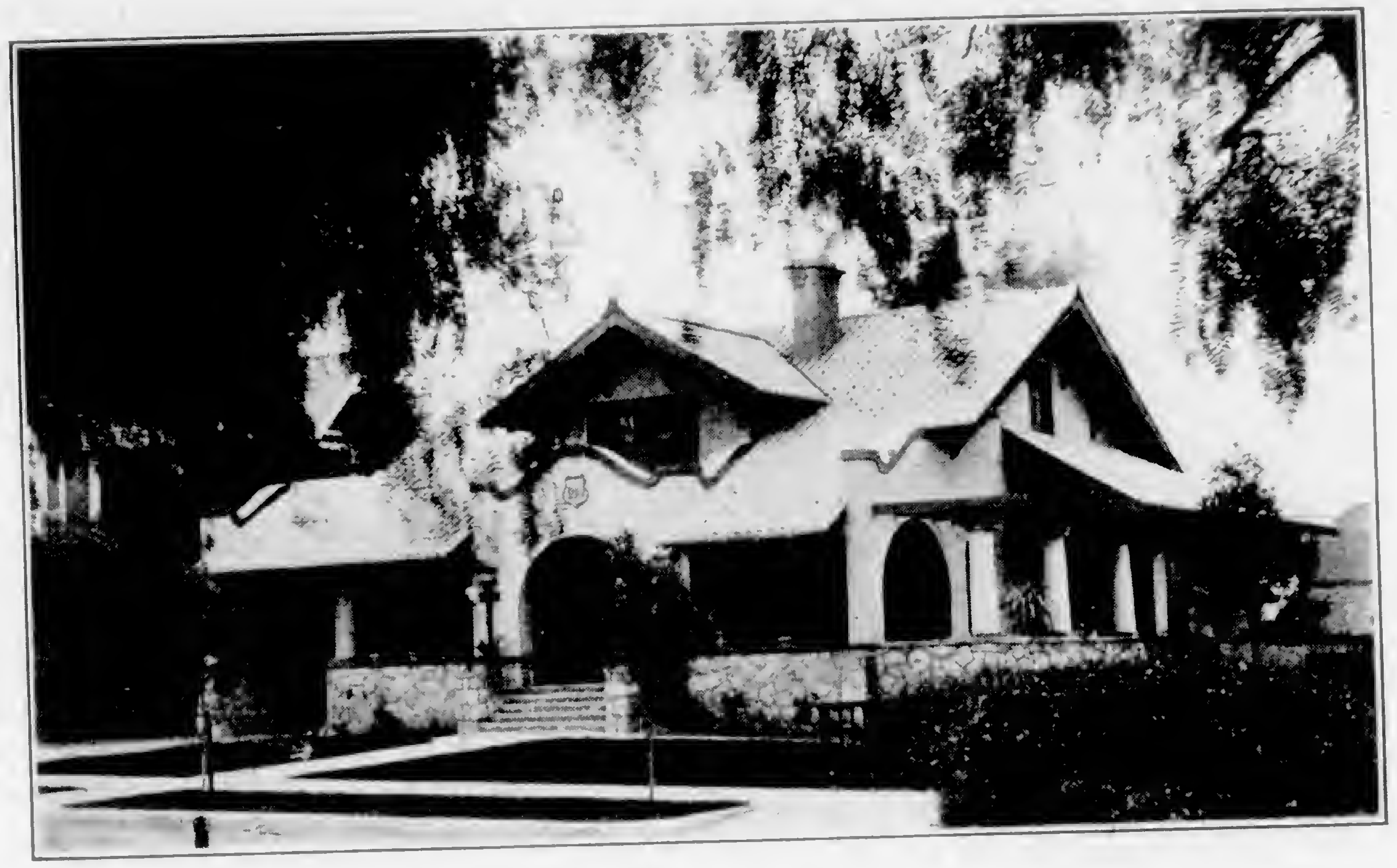
Altadena Residence of Mr. F. W. Kellogg
C. W. Buchanan, Architect



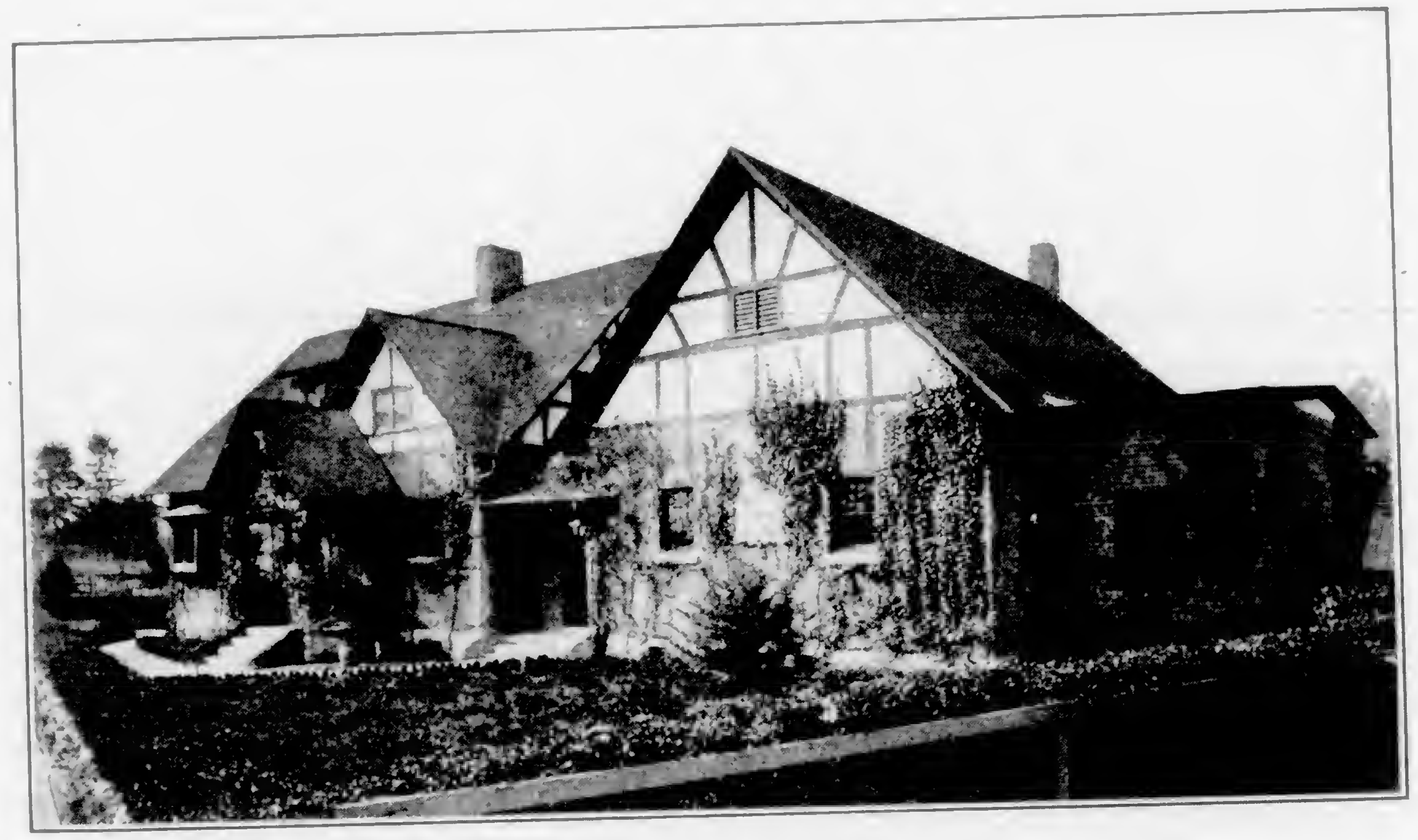
Residence of C. W. Buchanan, Architect, Pasadena



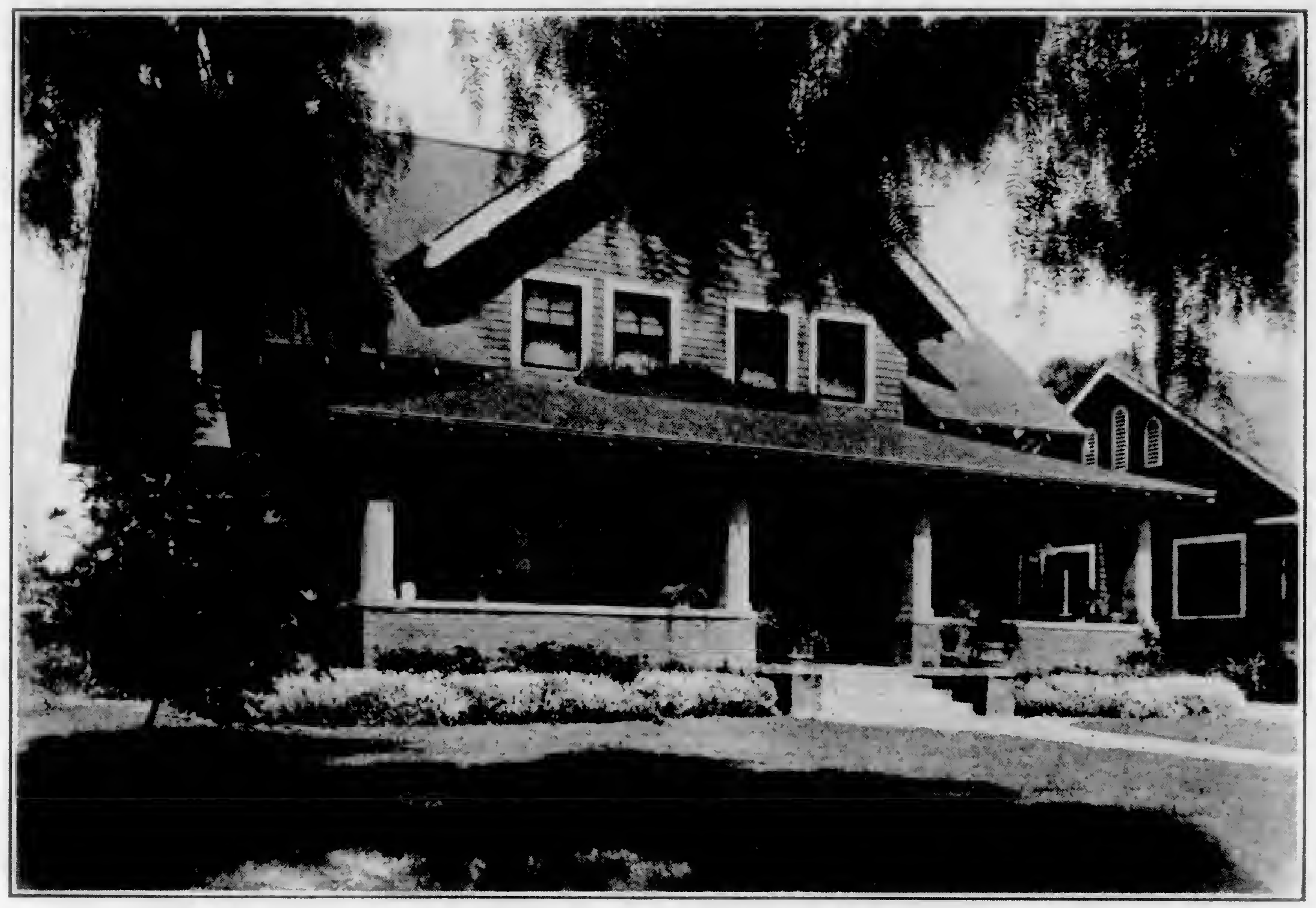
Interior, Residence of C. W. Buchanan, Architect



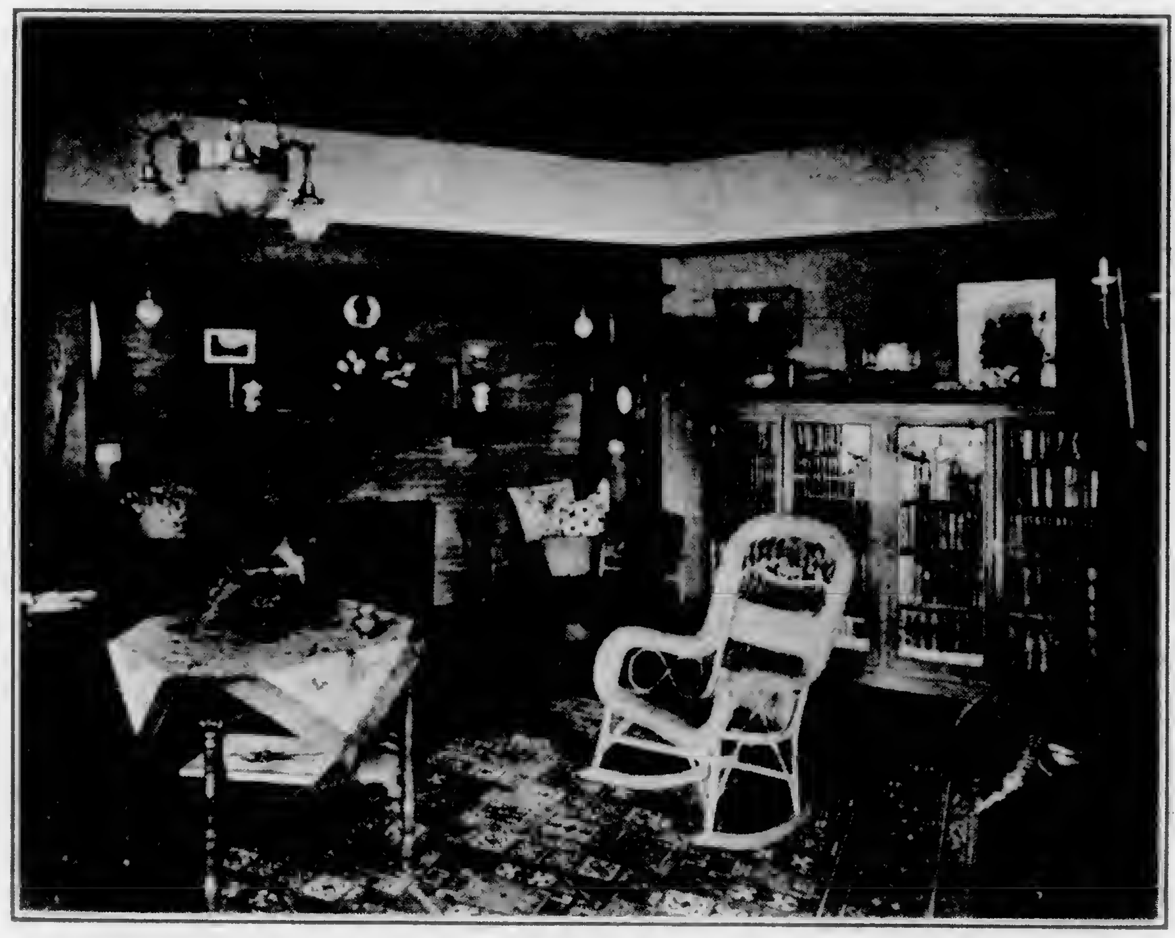
Residence of Mr. R. H. Penney, Pasadena
C. W. Buchanan, Architect



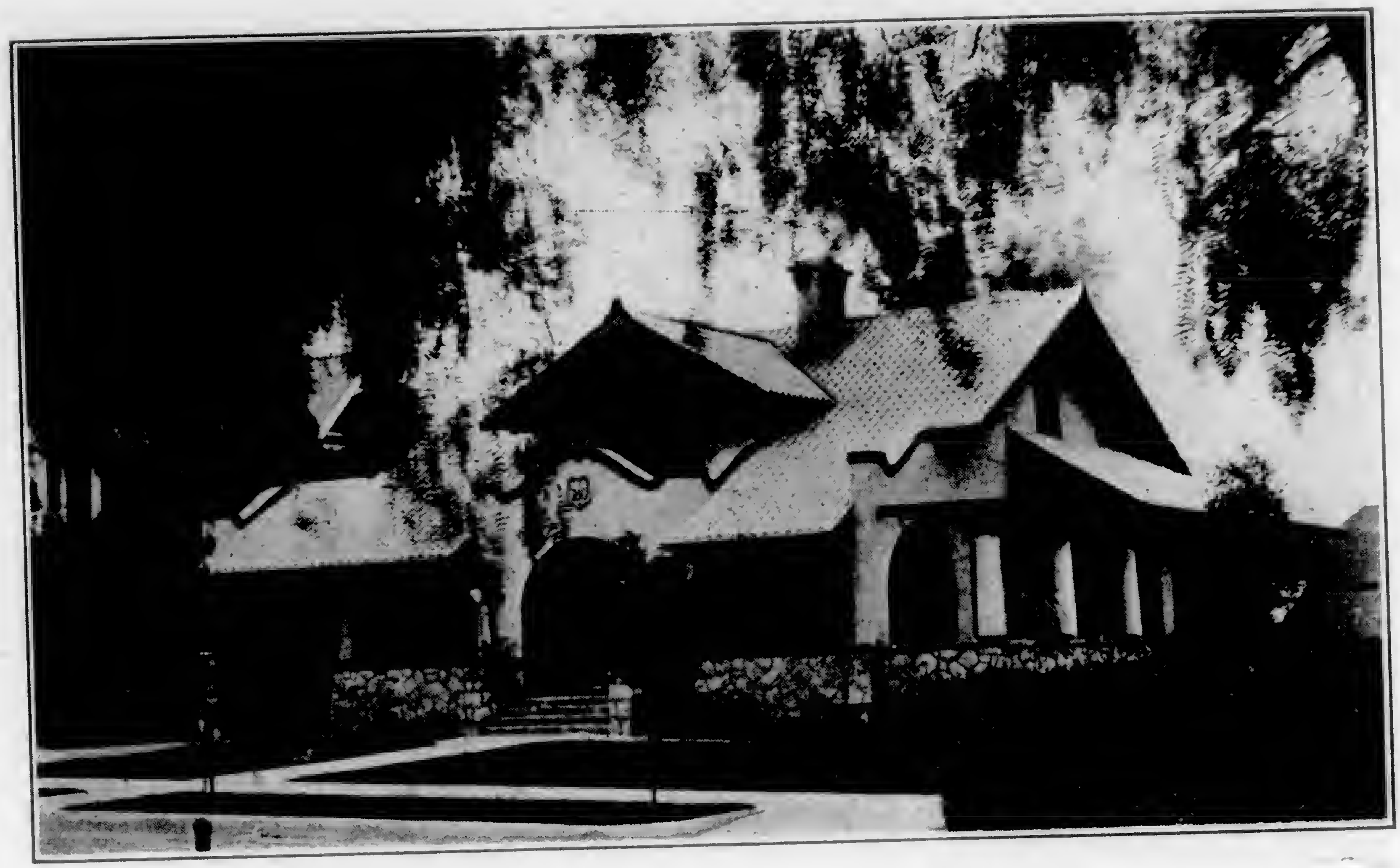
Stickney Memorial Building, Pasadena
C. W. Buchanan, Architect



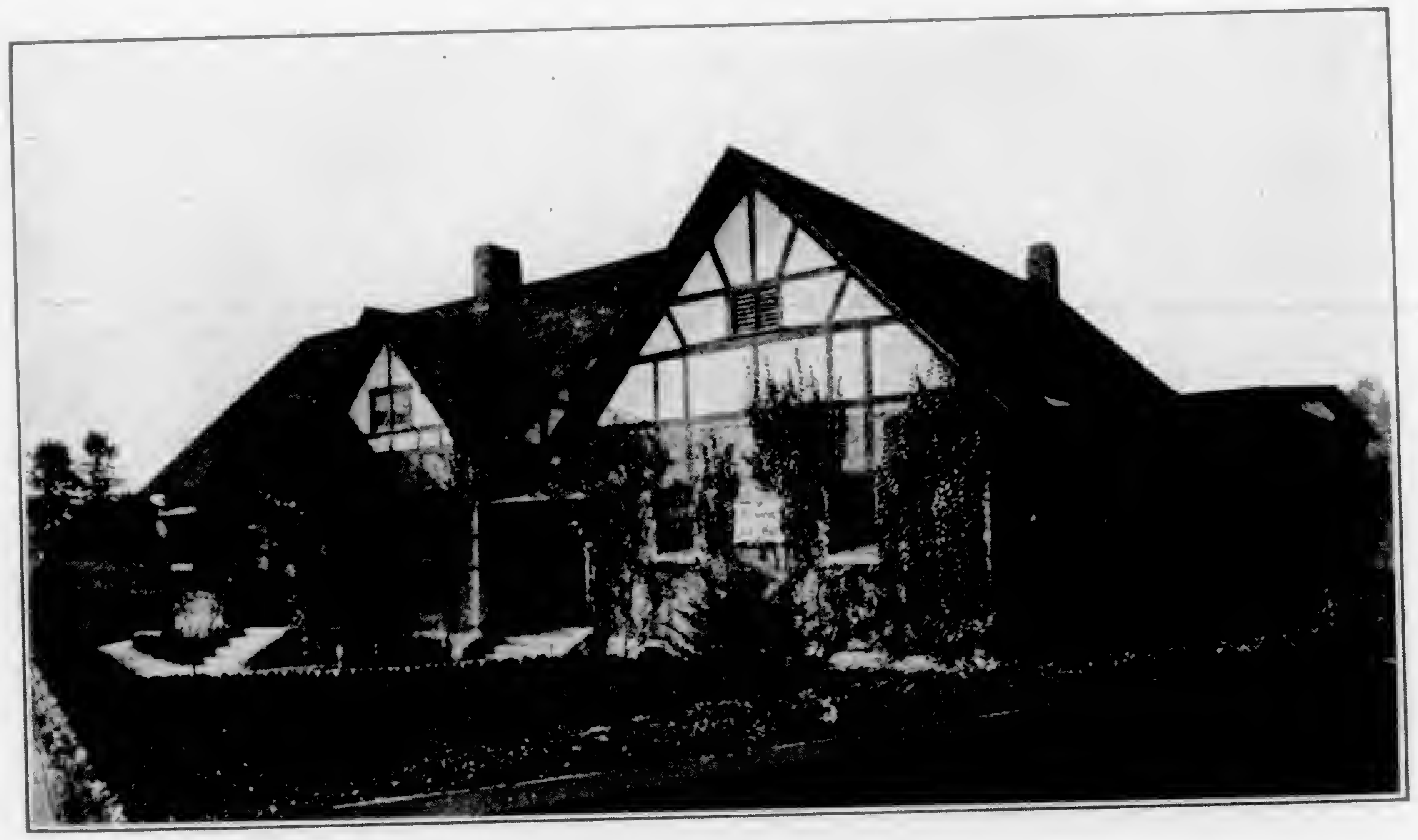
Residence of C. W. Buchanan, Architect, Pasadena



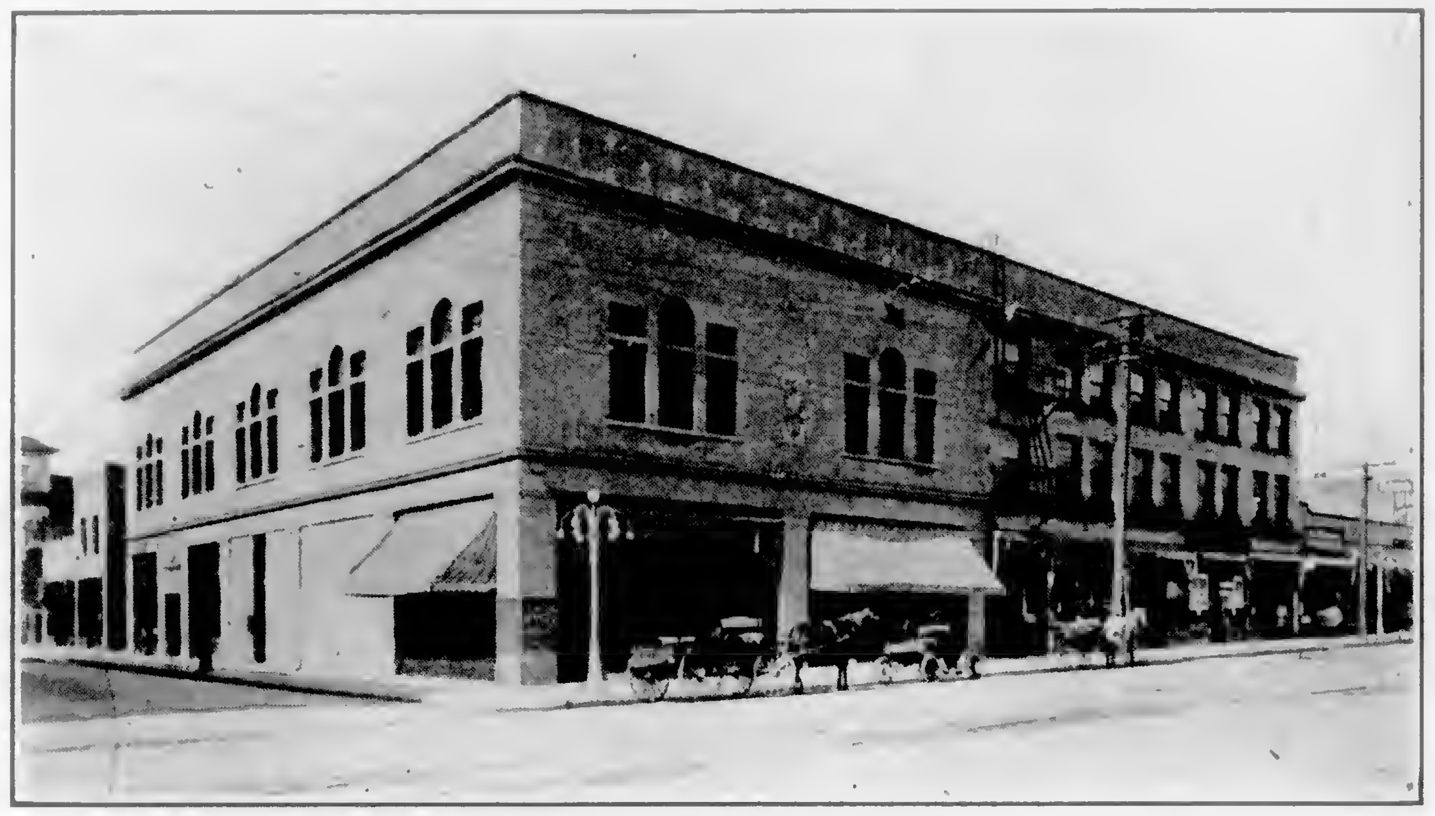
Interior, Residence of C. W. Buchanan, Architect



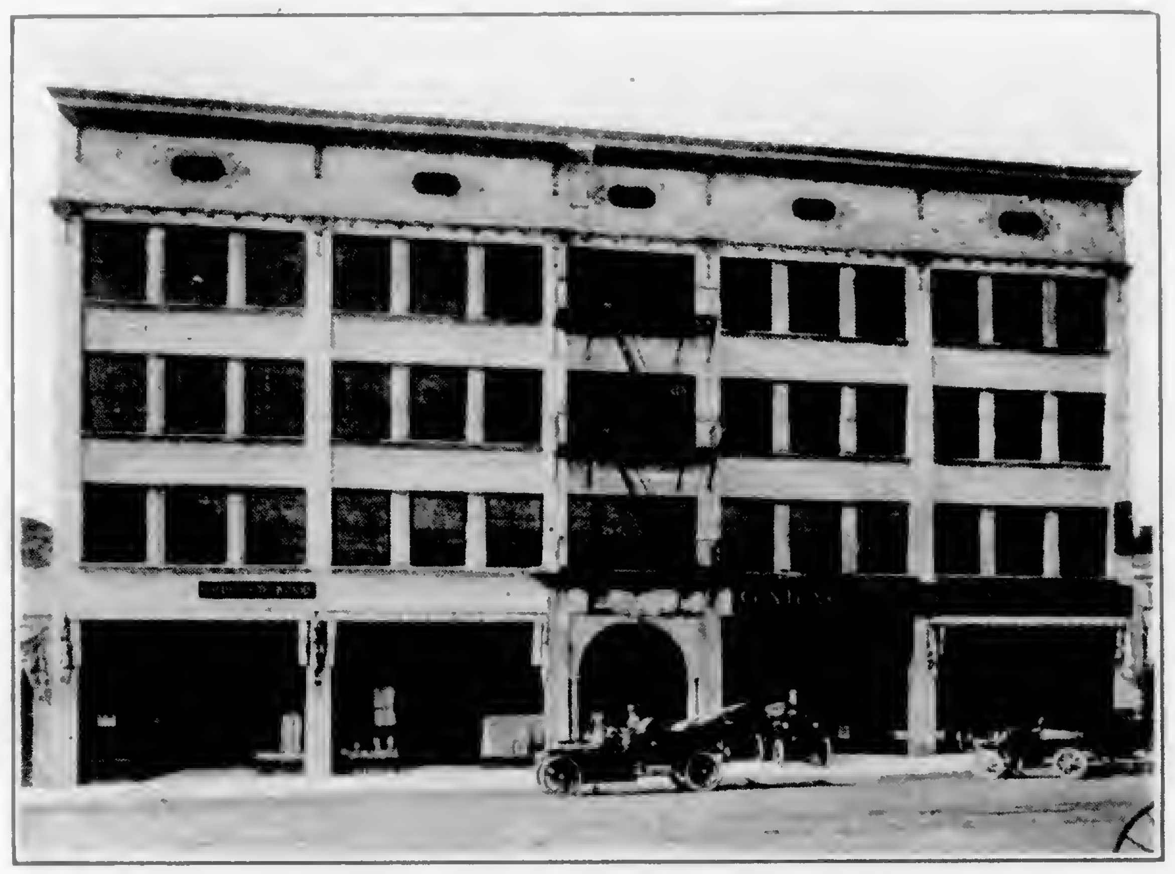
Residence of Mr. R. H. Penney, Pasadena
C. W. Buchanan, Architect



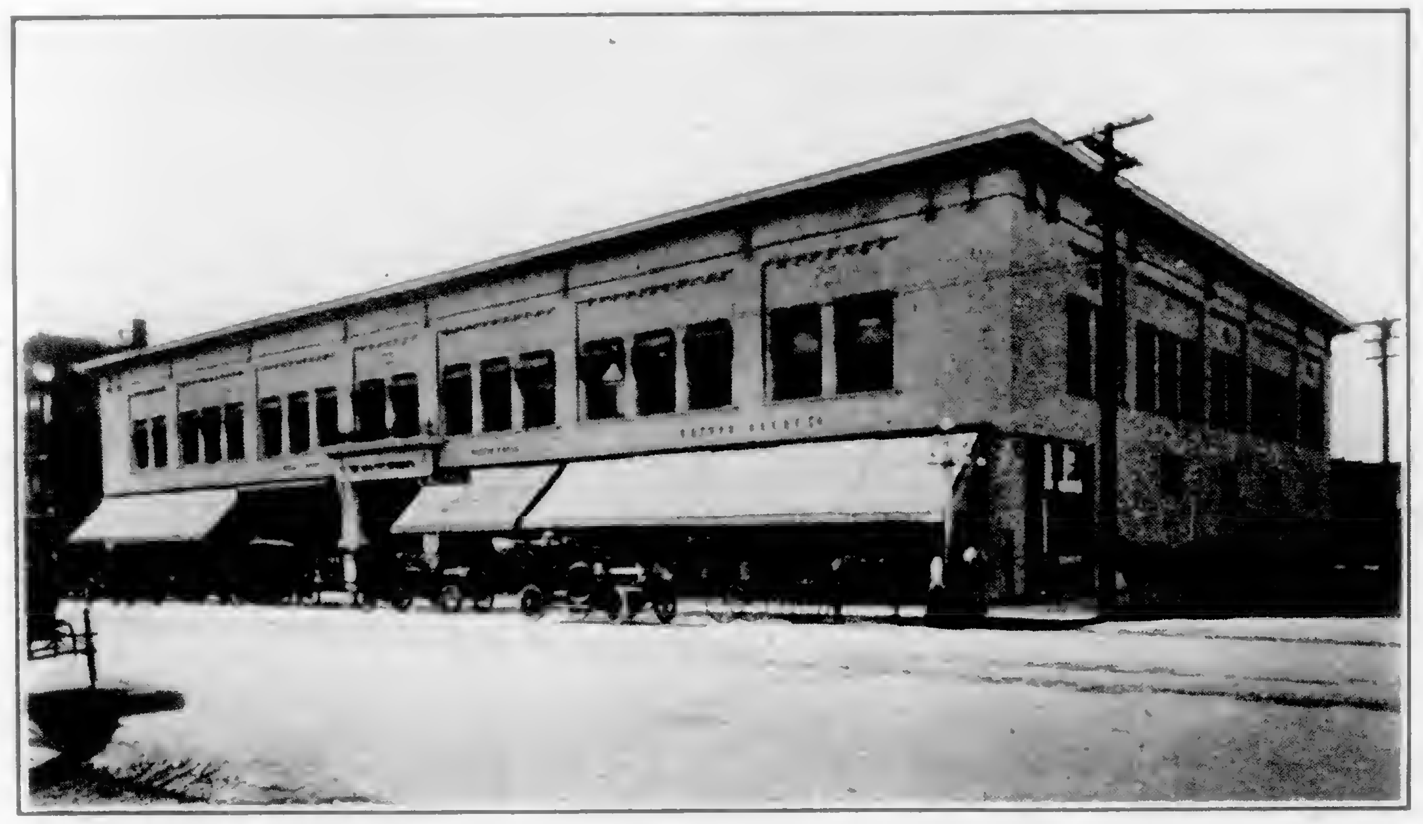
Stickney Memorial Building, Pasadena
C. W. Buchanan, Architect



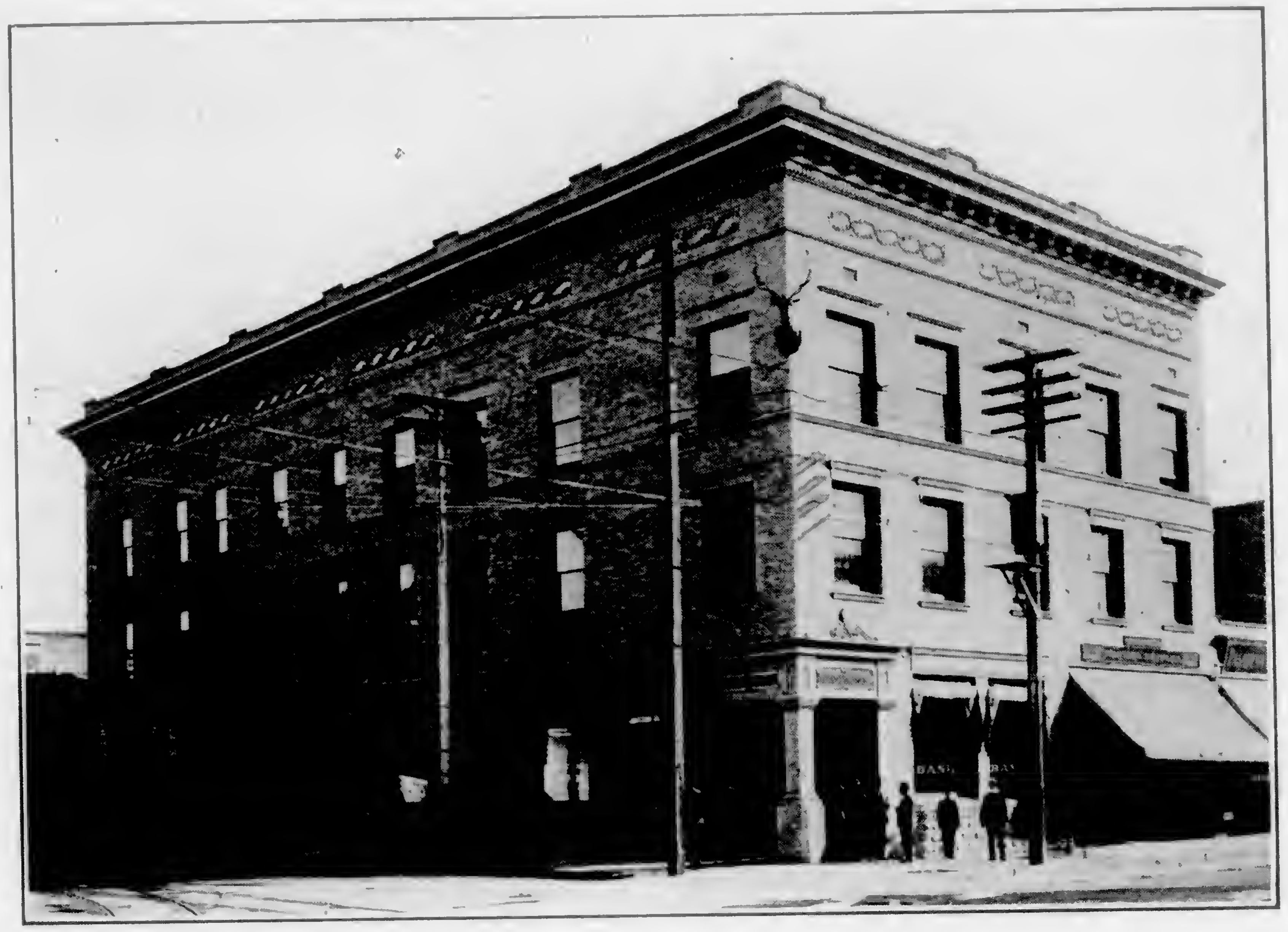
The B. O. Kendall Building, Pasadena. Equipped with Otis Elevators. C. W. Buchanan, Architect



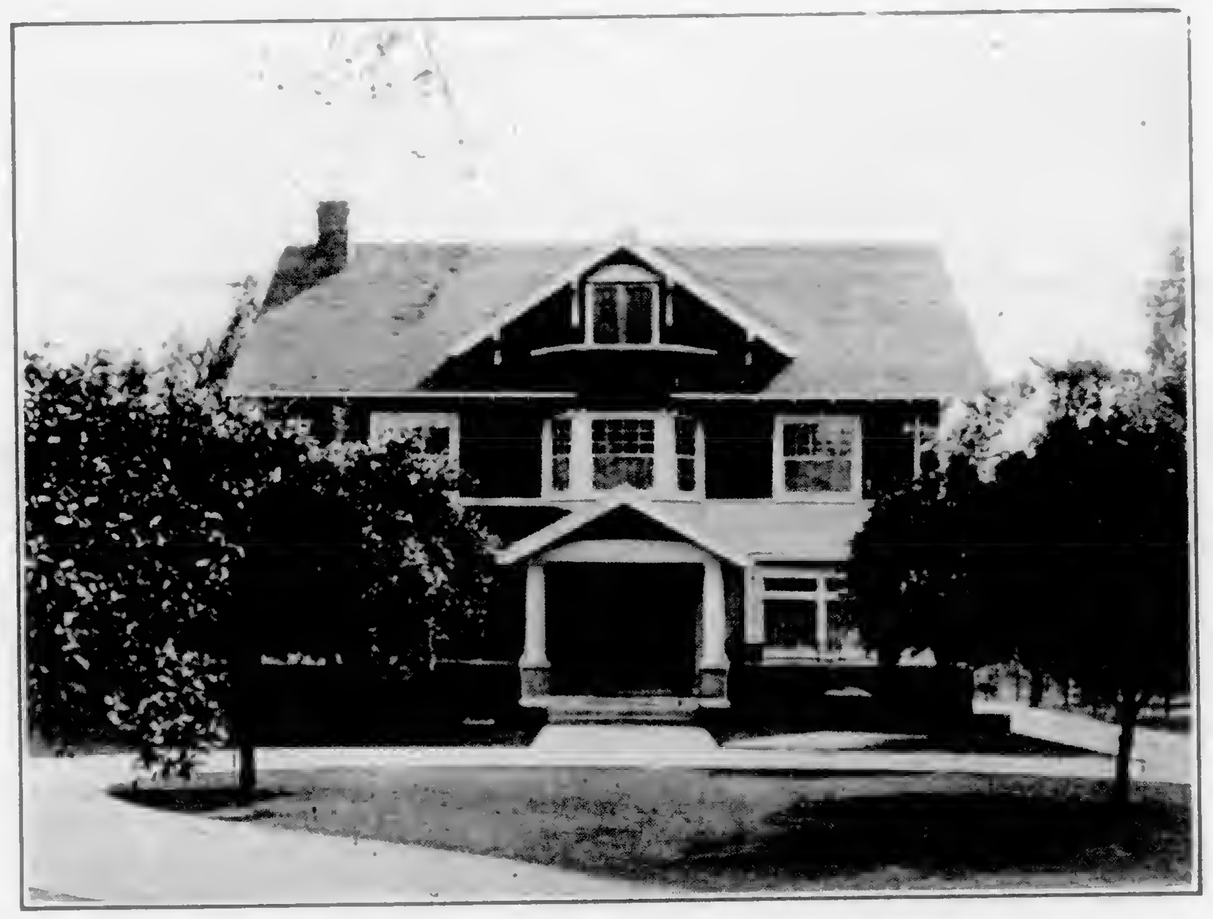
Braley Building, Pasadena. C. W. Buchanan, Architect



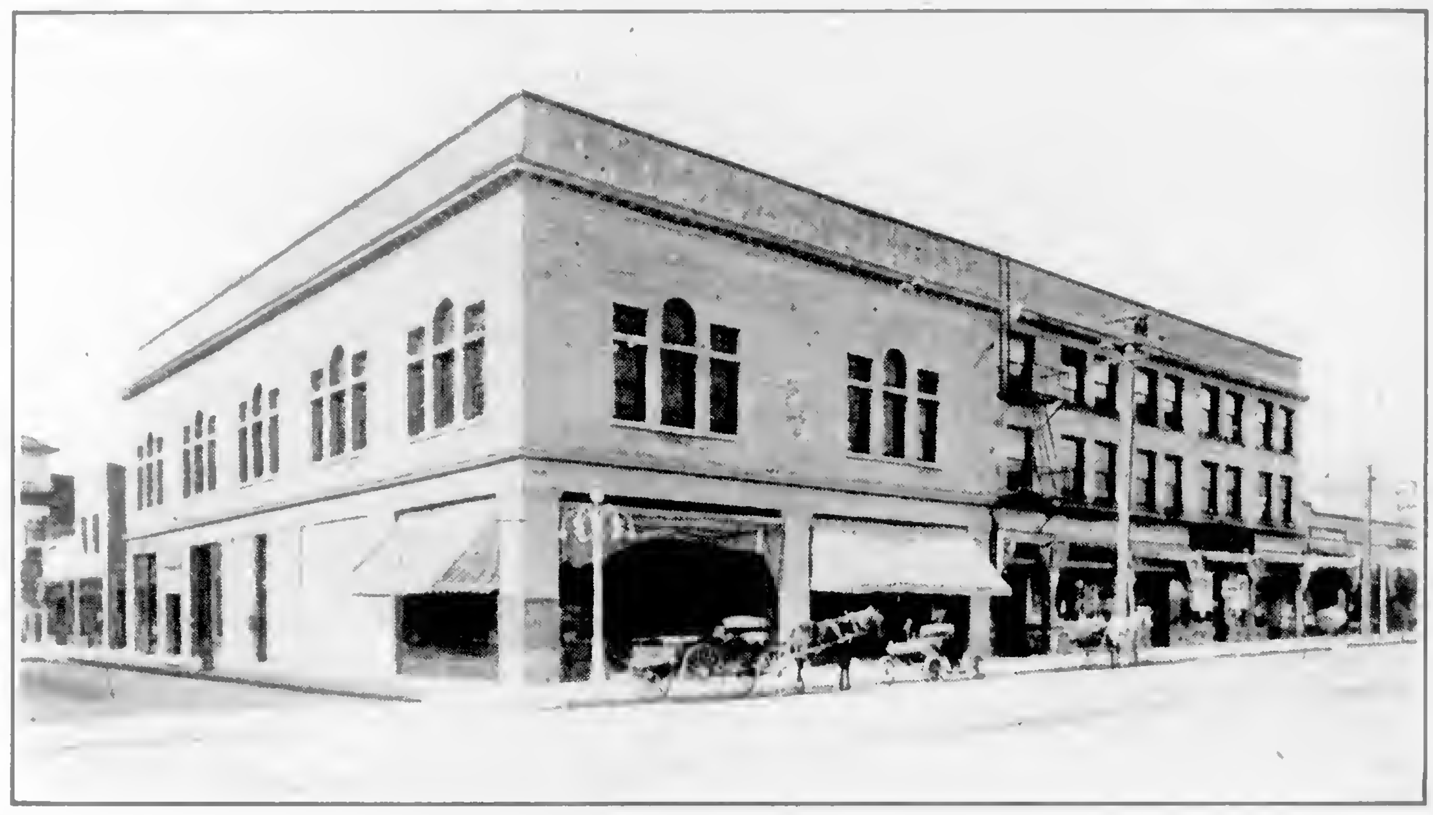
Boston Building, Pasadena. Equipped with Otis Elevators. C. W. Buchanan, Architect



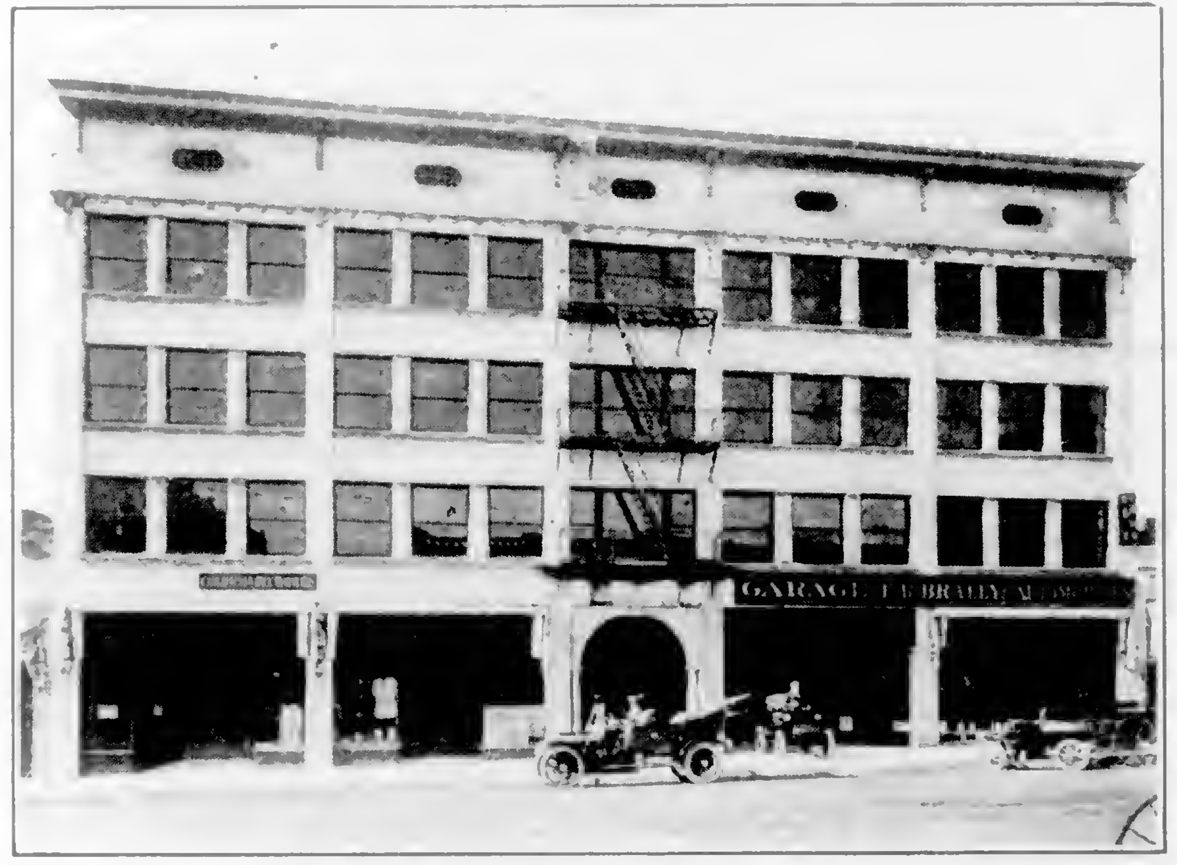
Union Savings Bank Building, Pasadena
C. W. Buchanan, Architect



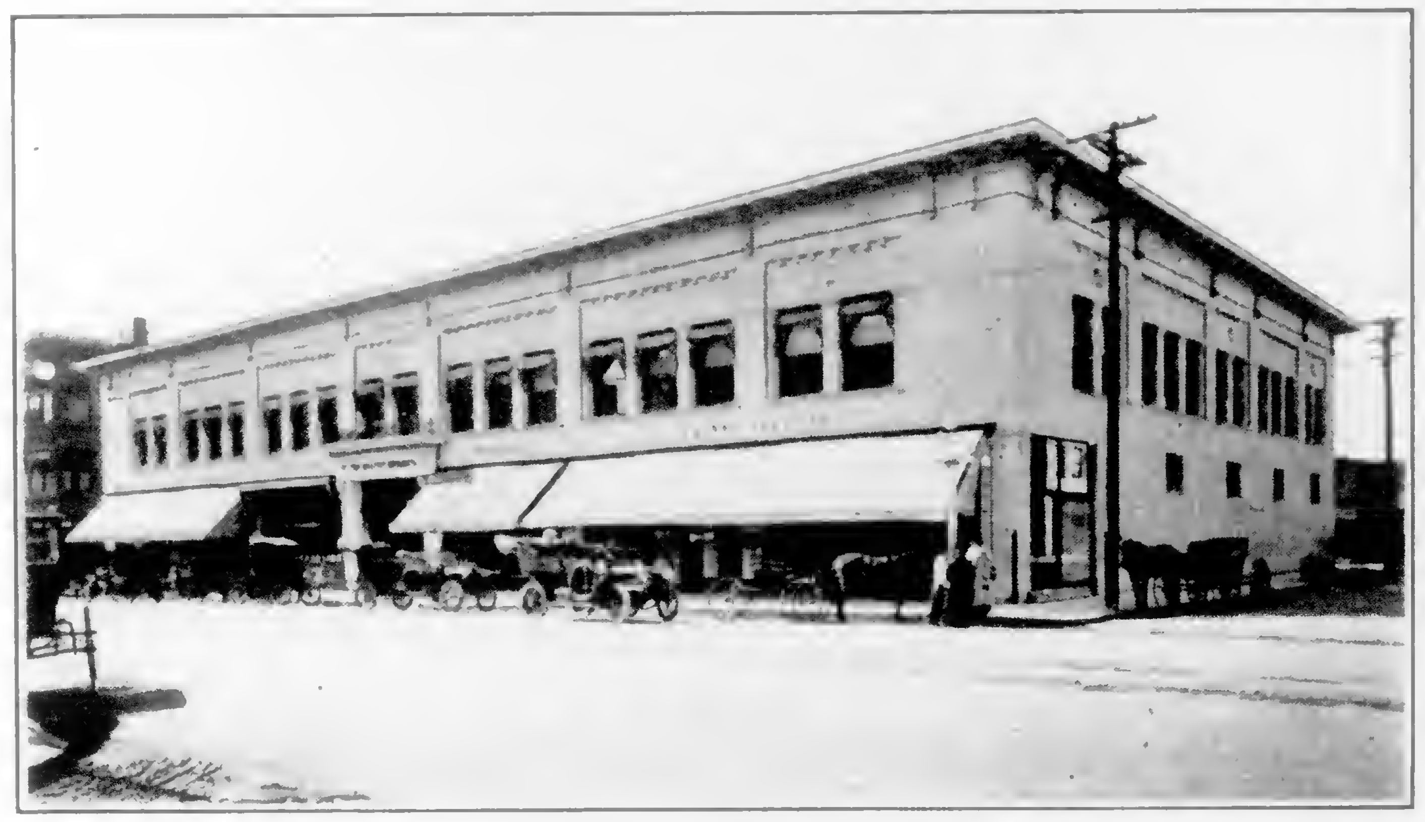
House of Mr. Geo. L. Hawkins, Pasadena
C. W. Buchanan, Architect



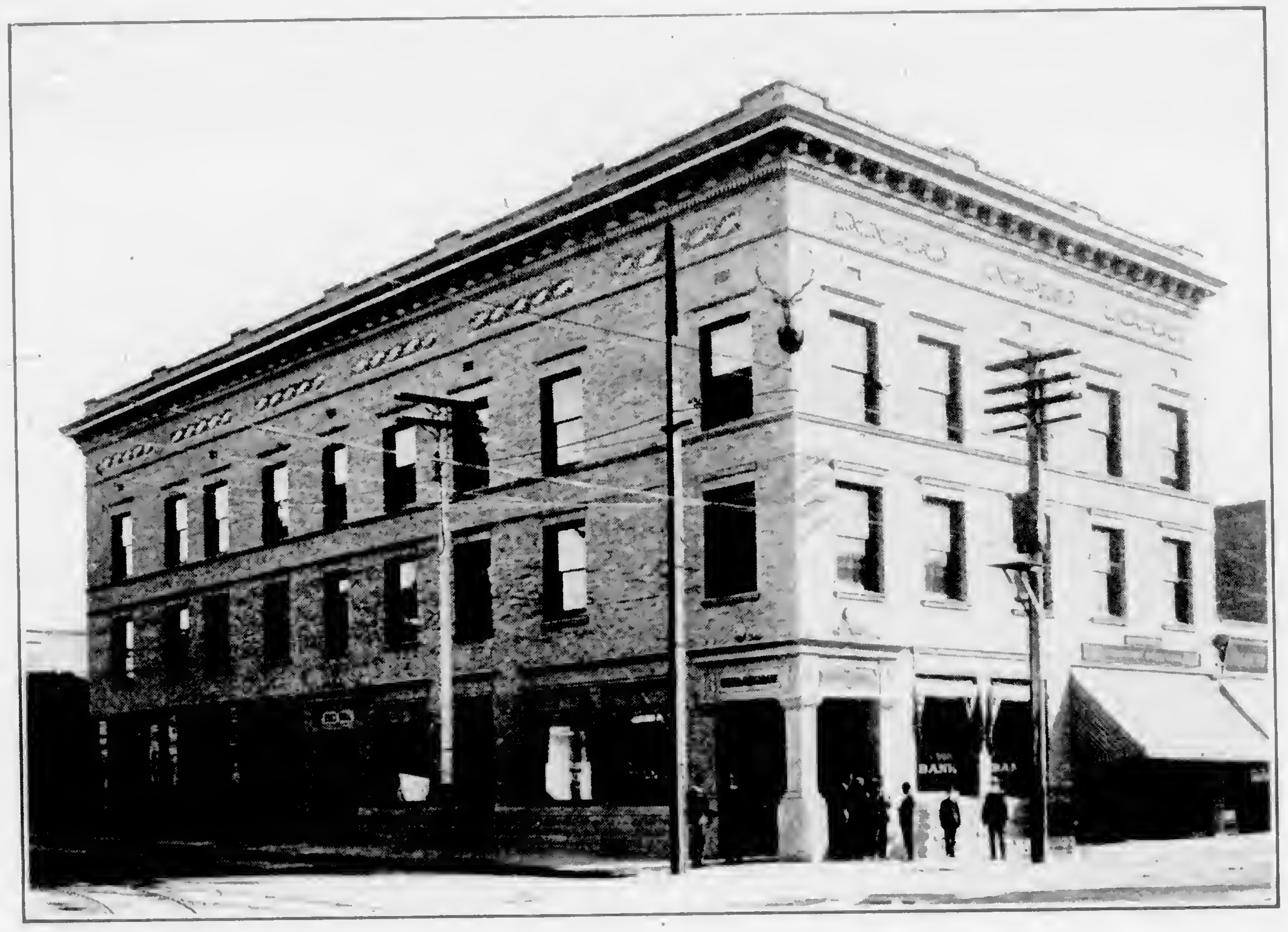
The B. O. Kendall Building, Pasadena. Equipped with Otis Elevators. C. W. Buchanan, Architect



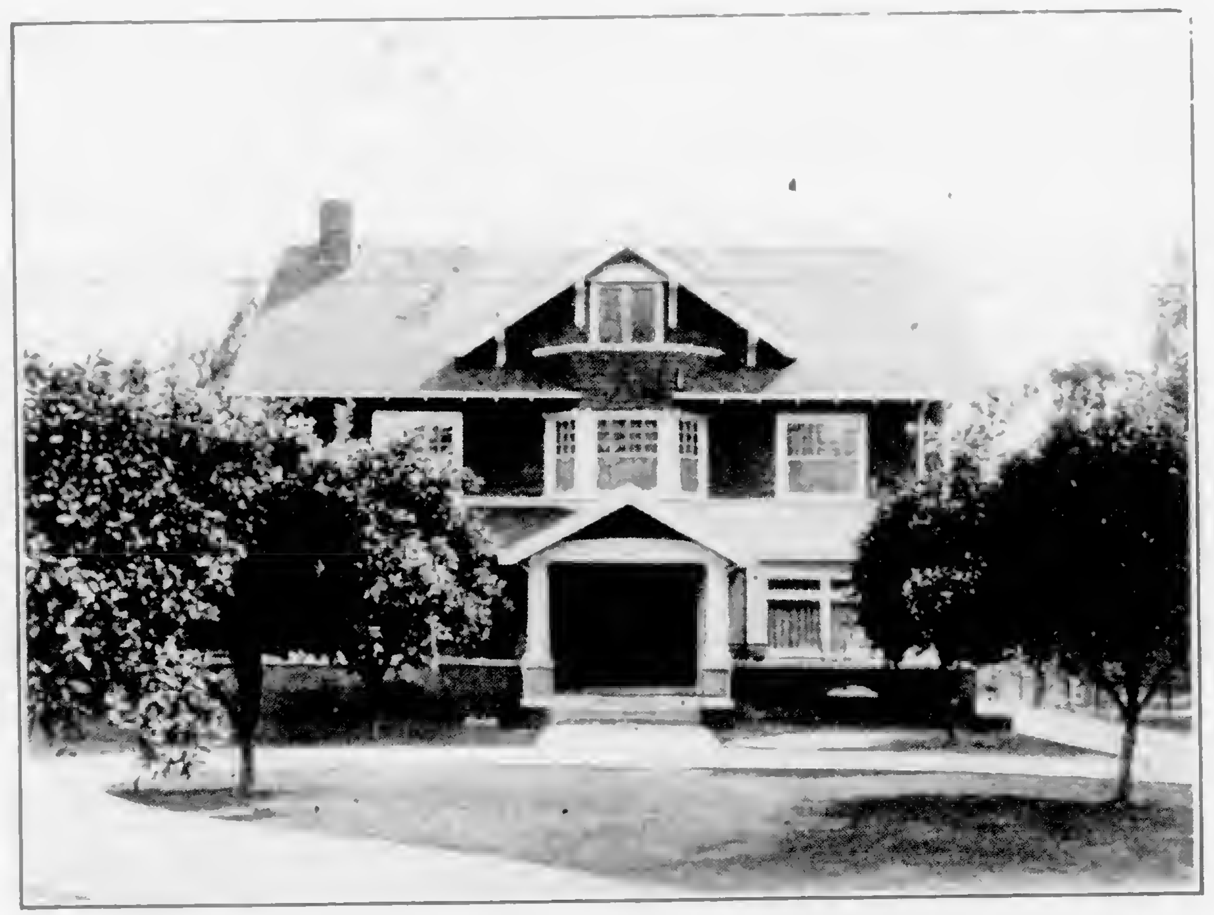
Braley Building, Pasadena. C. W. Buchanan, Architect



Boston Building, Pasadena. Equipped with Otis Elevators. C. W. Buchanan, Architect



Union Savings Bank Building, Pasadena
C. W. Buchanan, Architect



House of Mr. Geo. L. Hawkins, Pasadena
C. W. Buchanan, Architect

Echoes of the A.I.A. Convention at Chicago

WITHOUT doubt the most radical action taken at the recent convention of the American Institute of Architects, was the revision of the schedule of charges. The minimum charges have been advanced to a scale more nearly in accord with the conditions that prevail in the better established offices. The statistics gathered during the year by the Institute committee, Edgar V. Seeler, chairman, were the basis for the increase in charges; the scale of charges was determined by the collaboration of this committee with the committee of the convention, Grosvenor Atterbury, chairman. The new schedule was adopted by the convention without a dissenting vote. The scale of charges is preceded by a carefully considered preamble. It was wisely voted that the schedule be not mandatory.

Another matter that was taken up by the convention was the licensing of architects—a really important question which the delegates decided could be best handled by the local chapters instead of the National body. There is a sort of wisdom in this, for the registration of architects, however important to the profession as a whole, is as the committee states in its report, a state and not a national matter, and besides, the Institute as a whole is not yet decided upon the question of registration, many doubting its benefits. There is also another reason why the action or even the expression of the Institute might not be wise, and that is because it is, after all, hardly a professional matter. While it should be endorsed by all members of standing in the profession, and is of even vital importance to its proper advancement along ethical as well as practical lines, it is of more importance to the public in general and the entire building trades.

It is the trades organizations, and the public representatives in the local legislatures that should demand regulation of the profession, so that none but competent practitioners be allowed to draw plans for structures which the workmen erect and the public will inhabit. It is probable that because architects have heretofore urged registration single handed, and therefore presumably for selfish motives, that the representatives of the public have in so many instances refused to establish state registration boards. The greater publicity that can be given the matter, especially through such able reports as that presented, the sooner will the public become informed of the benefits to be derived from the registration of architects, and that it is not a professional, but a public benefit that will be gained.

Regarding the vexed question of competitions, the convention voted to recognize three forms: (A) Limited to invited architects; (B) open to all architects; (C) mixed; invited and not invited. It was decided as unadvisable at this time to recommend a fixed code of competition. It was voted that competition programs should be approved by architectural advisers. Along these broad lines it was possible to obtain definite action by the convention.

Through the recommendation of the committee on education interscholastic competitions were favored, and $150 voted for medals to be awarded in them. The report of this committee advocated advanced standards of education for the architectural profession, especially with regard to general culture. The atelier system for the study of advanced design is strongly favored by the committee, but it is thought best not to force this method. In their opinion the growth of the atelier system will come from natural conditions, and it is best that it proceed in accordance with the demand. A most important step in the work of the committee was the joint conferences with the heads of five prominent schools of architecture held during the year.

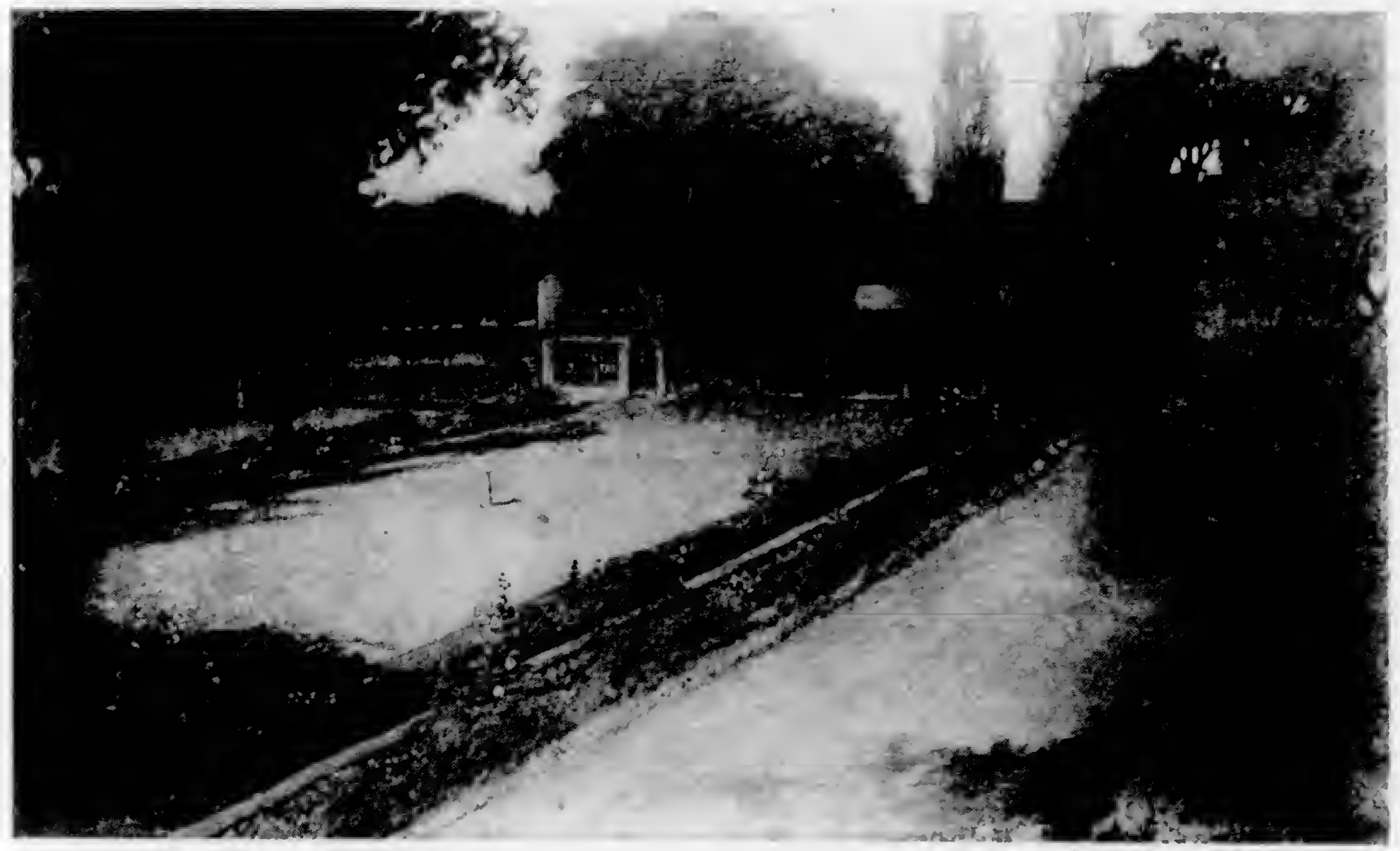
SELECTIONS
from the
Portland Architectural Club's
First Annual Exhibition

Villa D'Este Tivoli

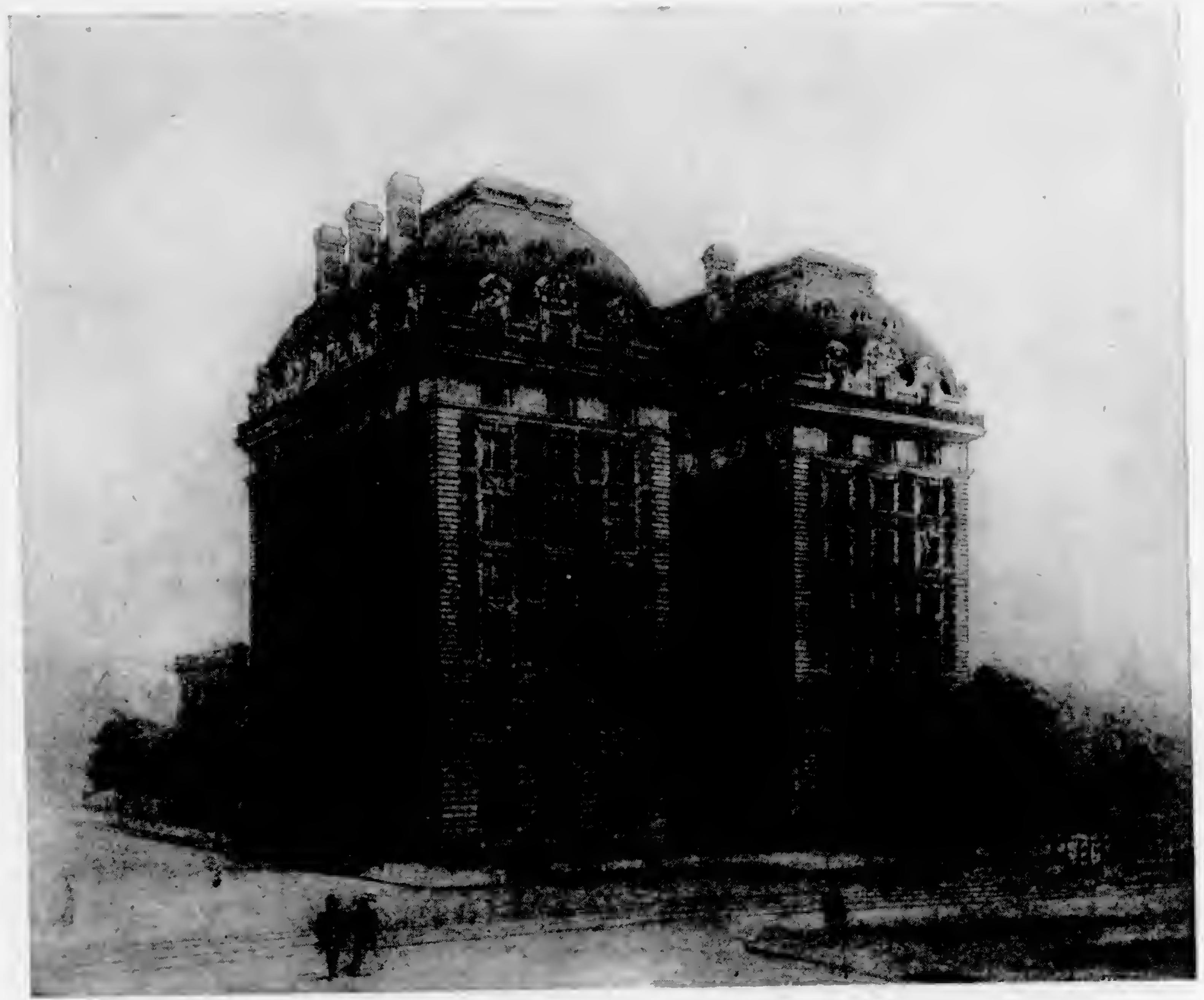
By M. H. Whitehouse

A Country House *Kelly & Newberry, Architects*

Vellucent Panel. "Ceres"—Painted by Granvel Fell. Cedric Chivers, Bath, England



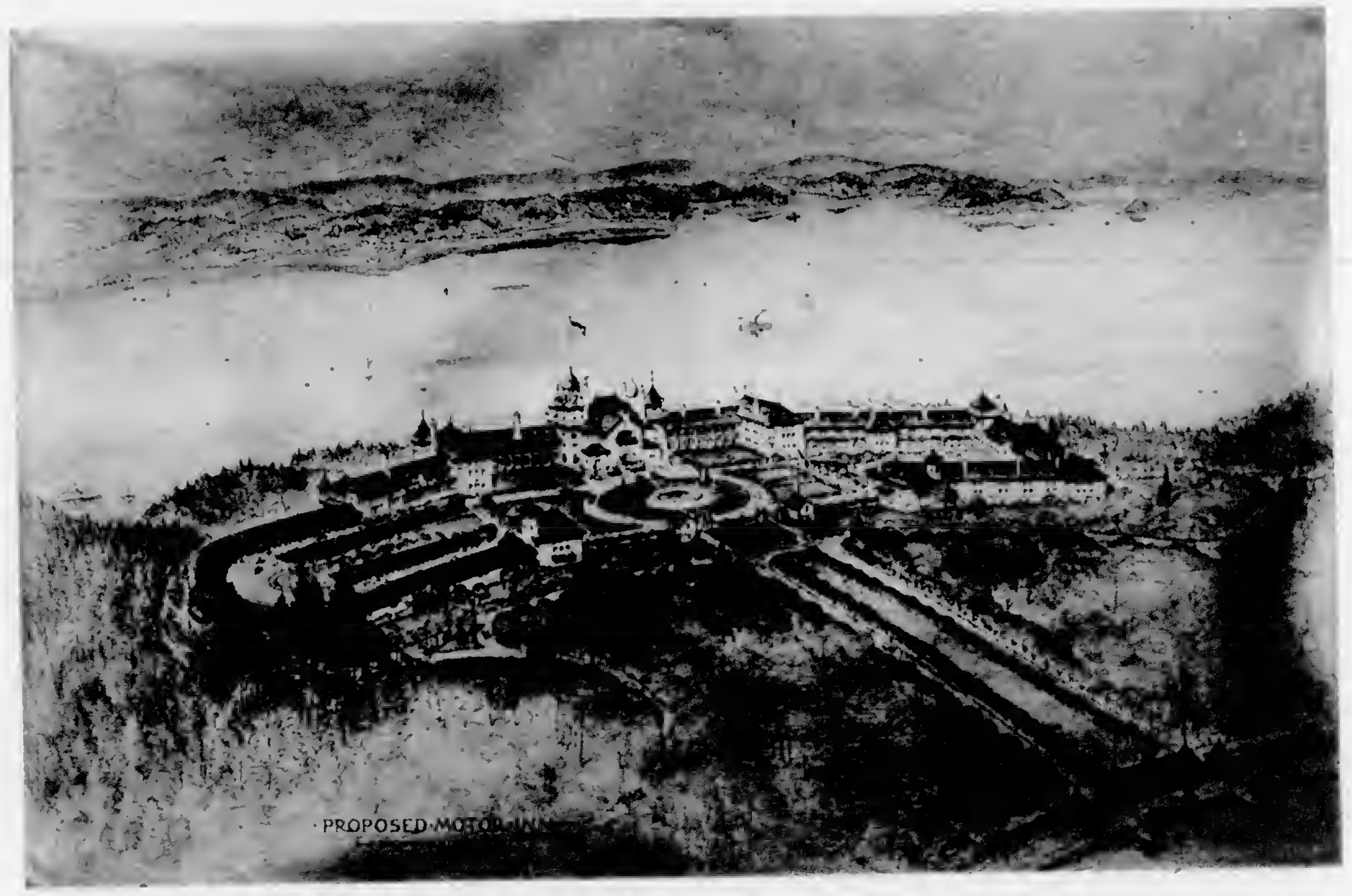
A Country House *Kelly & Newberry, Architects*



Equipped with Otis Elevators

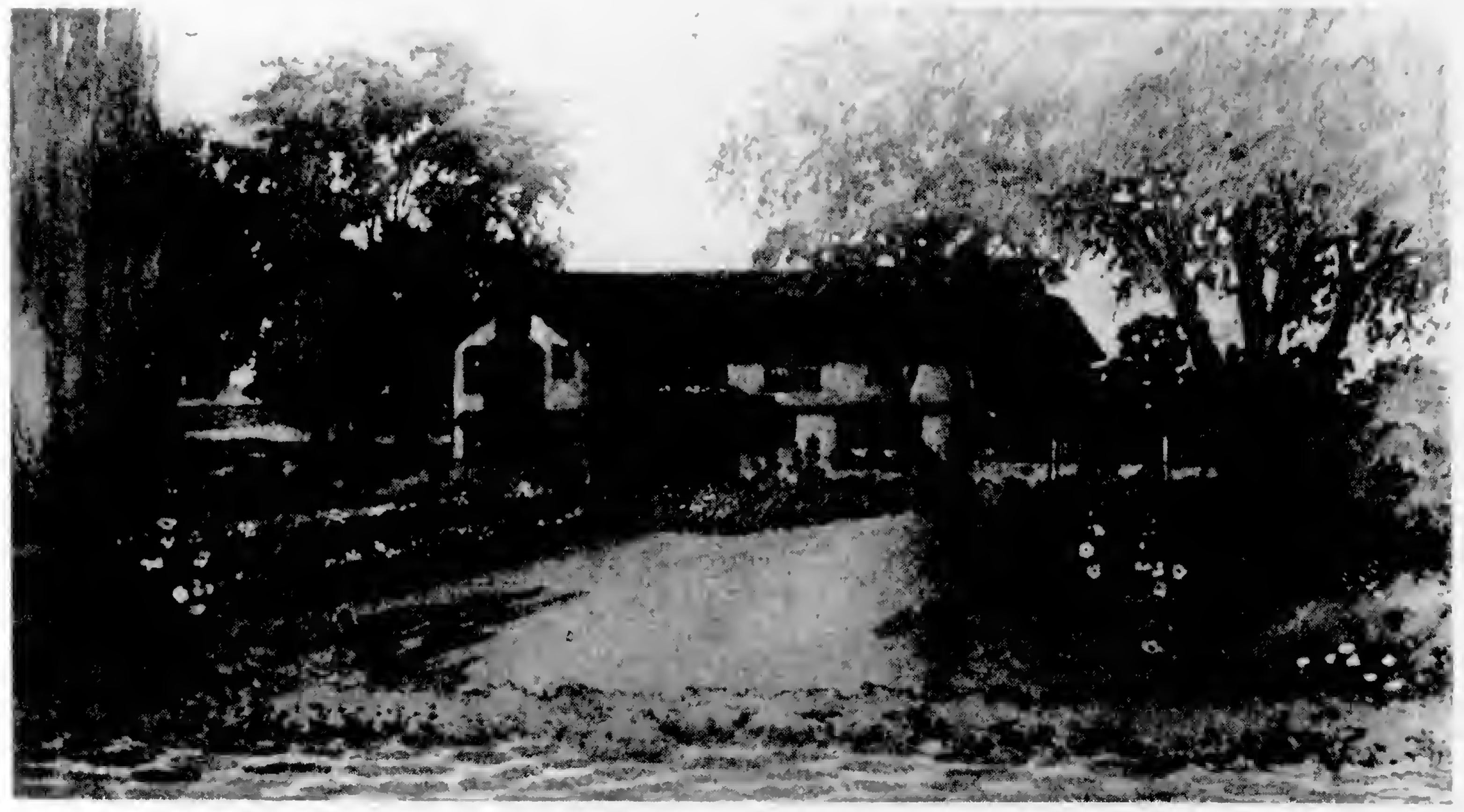
The Perry Apartments, Seattle, Washington

Sommervell & Cote, Architects

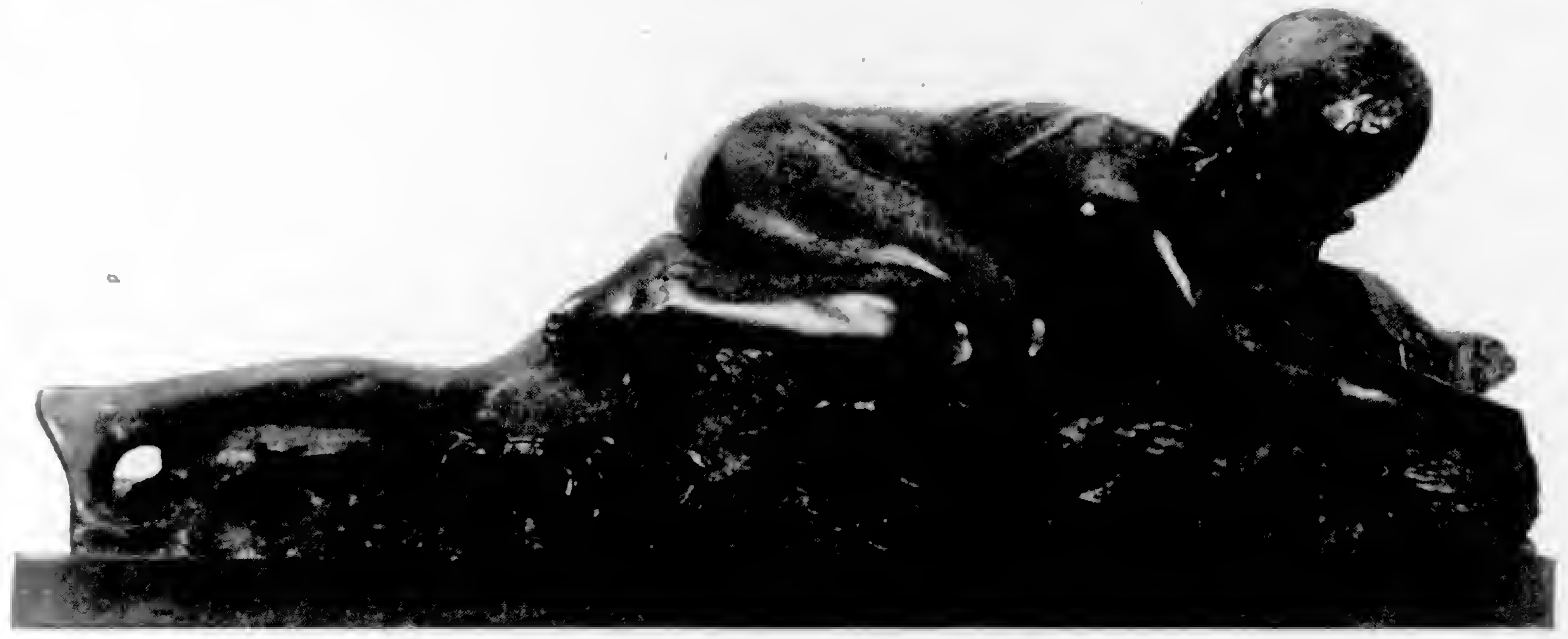


Proposed Motor-Inn near Seattle

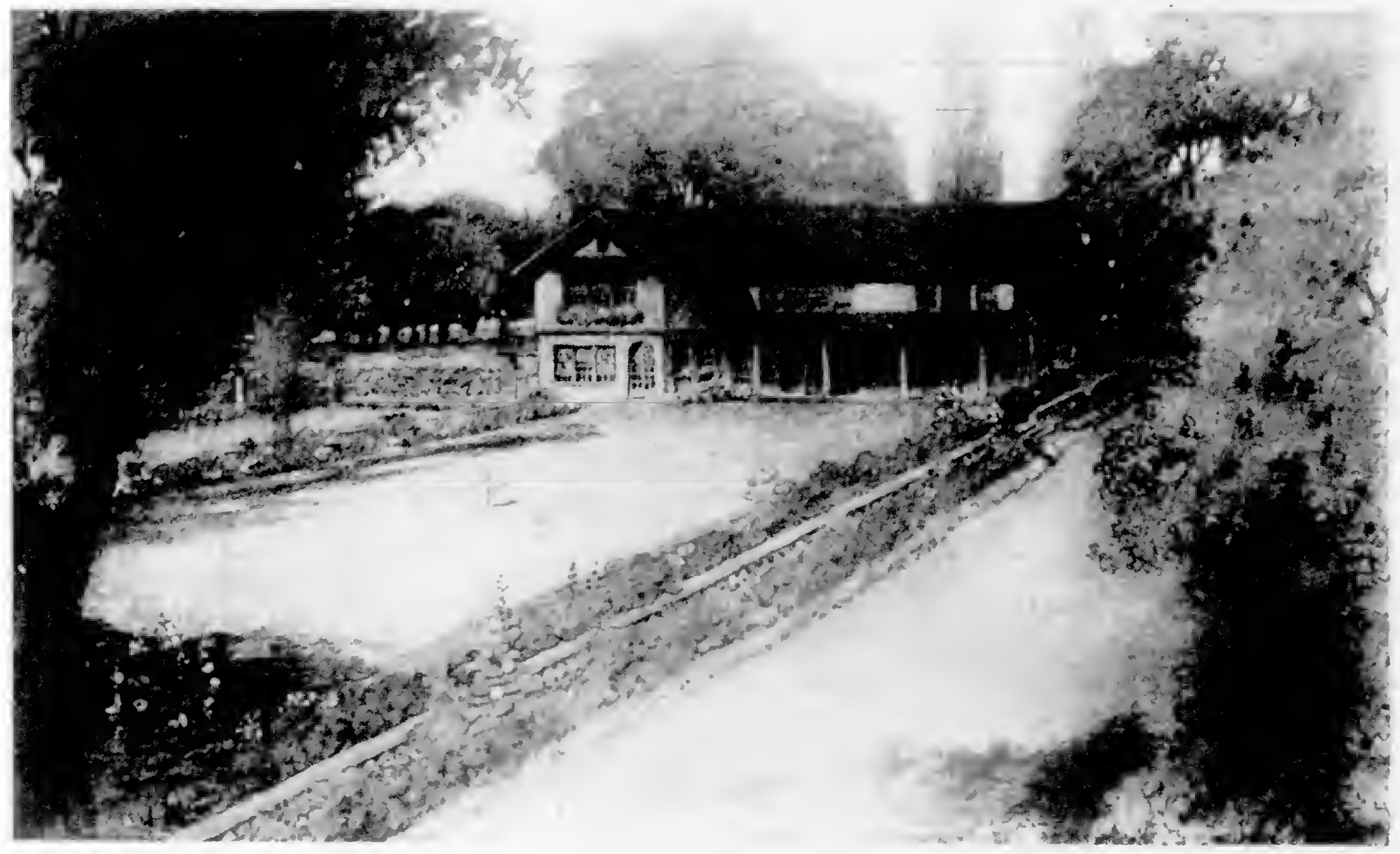
A. Warren Gould, Architect



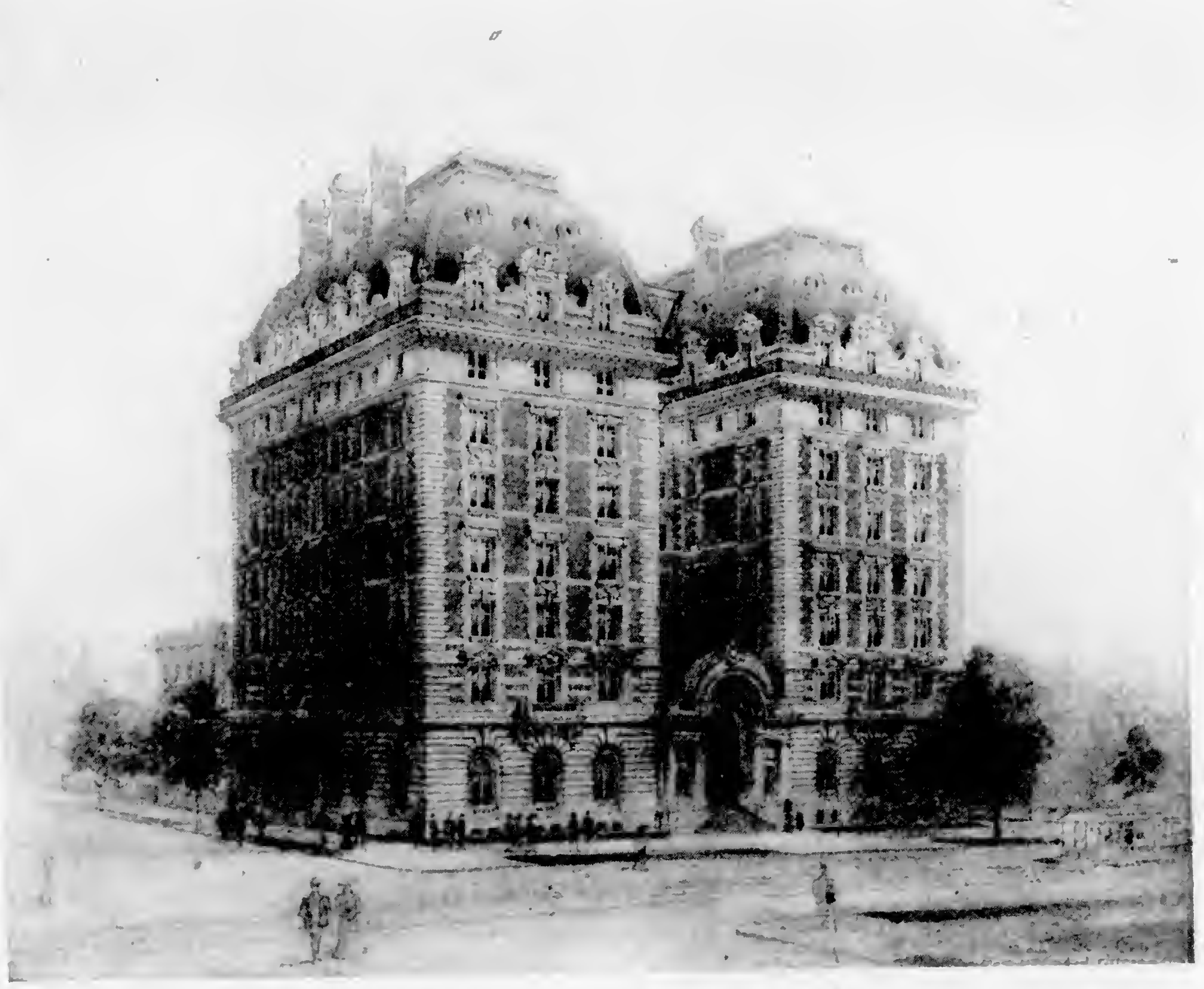
A Country House *Kelly & Newberry, Architects*



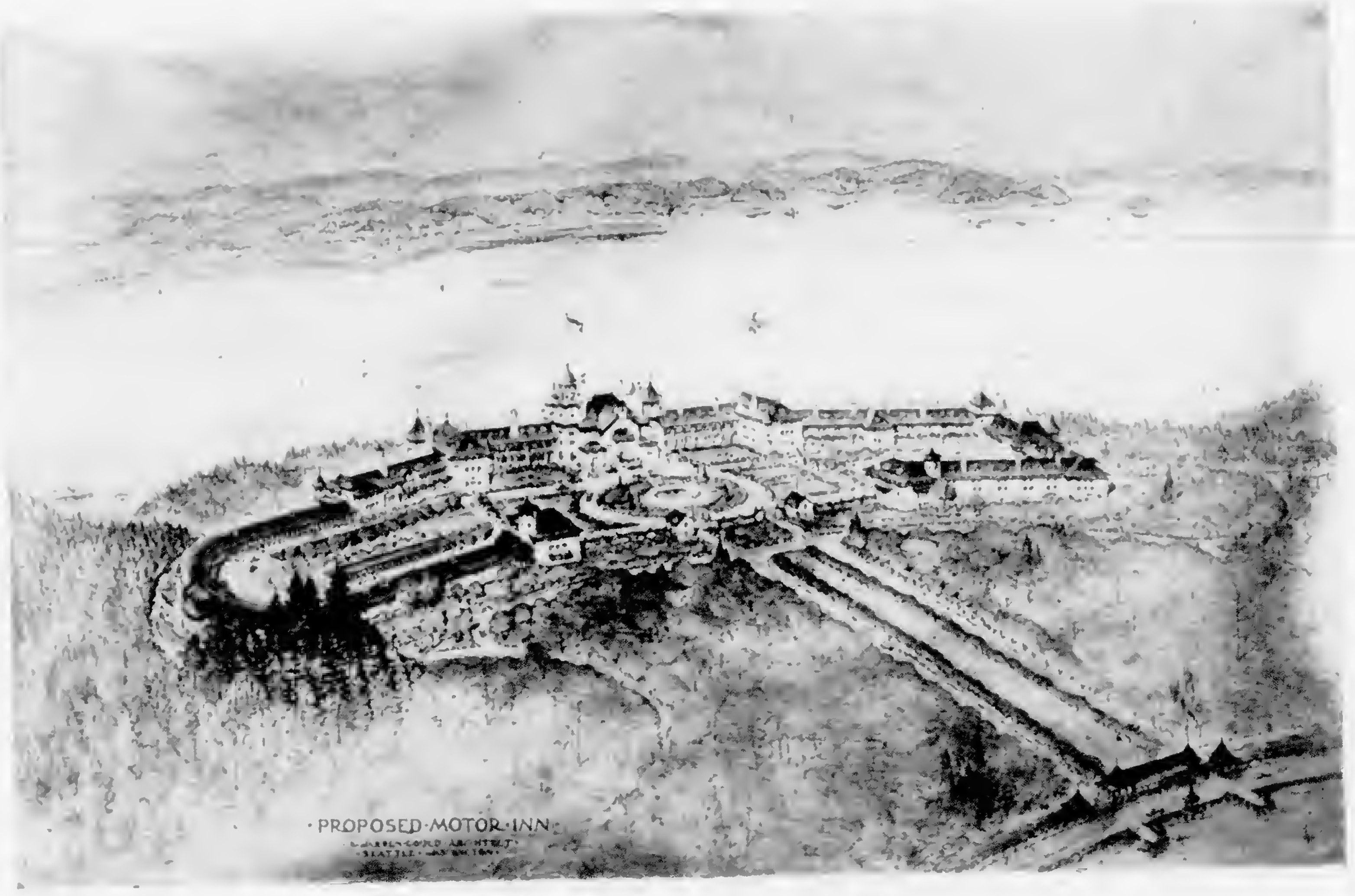
Vellucent Panel, "Ceres"—Painted by Granvel Fell. Cedric Chivers, Bath, England



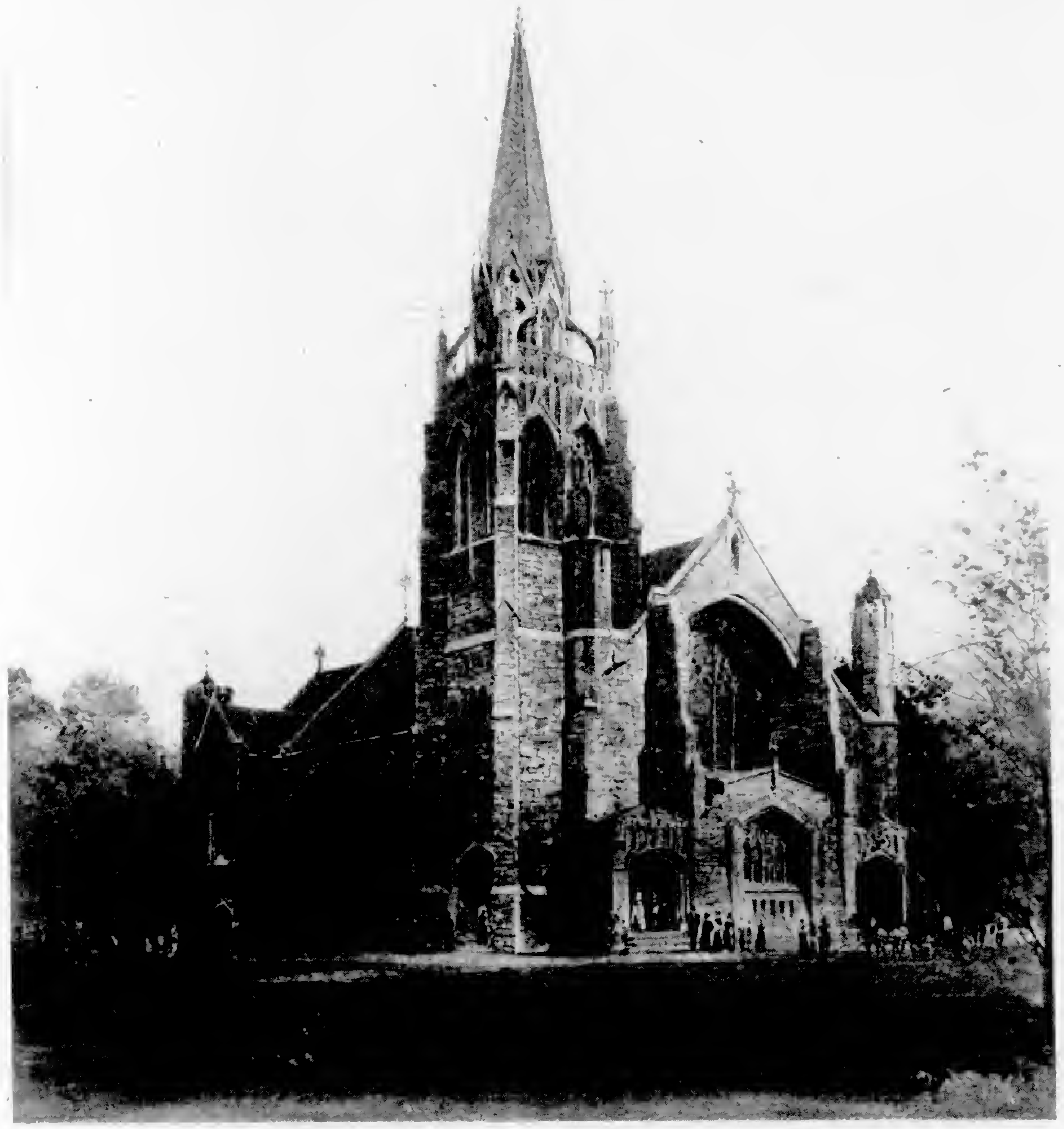
A Country House *Kelly & Newberry, Architects*



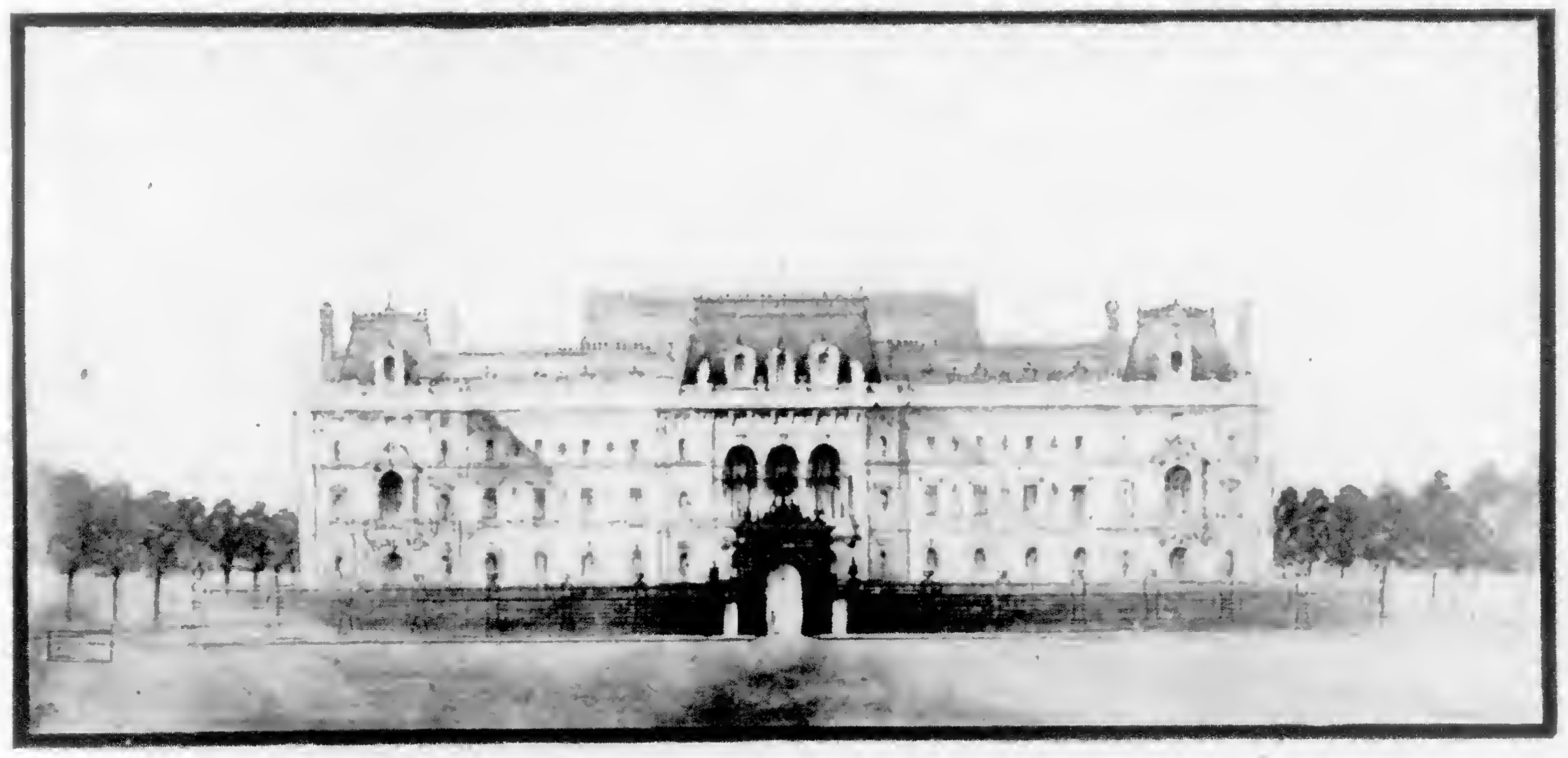
Equipped with Otis Elevators *The Perry Apartments, Seattle, Washington*
Sommervell & Cote, Architects



Proposed Motor Inn near Seattle
A. Warren Gould, Architect



Perspective Exterior St. Luke's Church, San Francisco. Sutton & Weeks, Architects



Elevation American Embassy, Paris. M. H. Whitehouse, Architect

The Neglect of Waterproofing

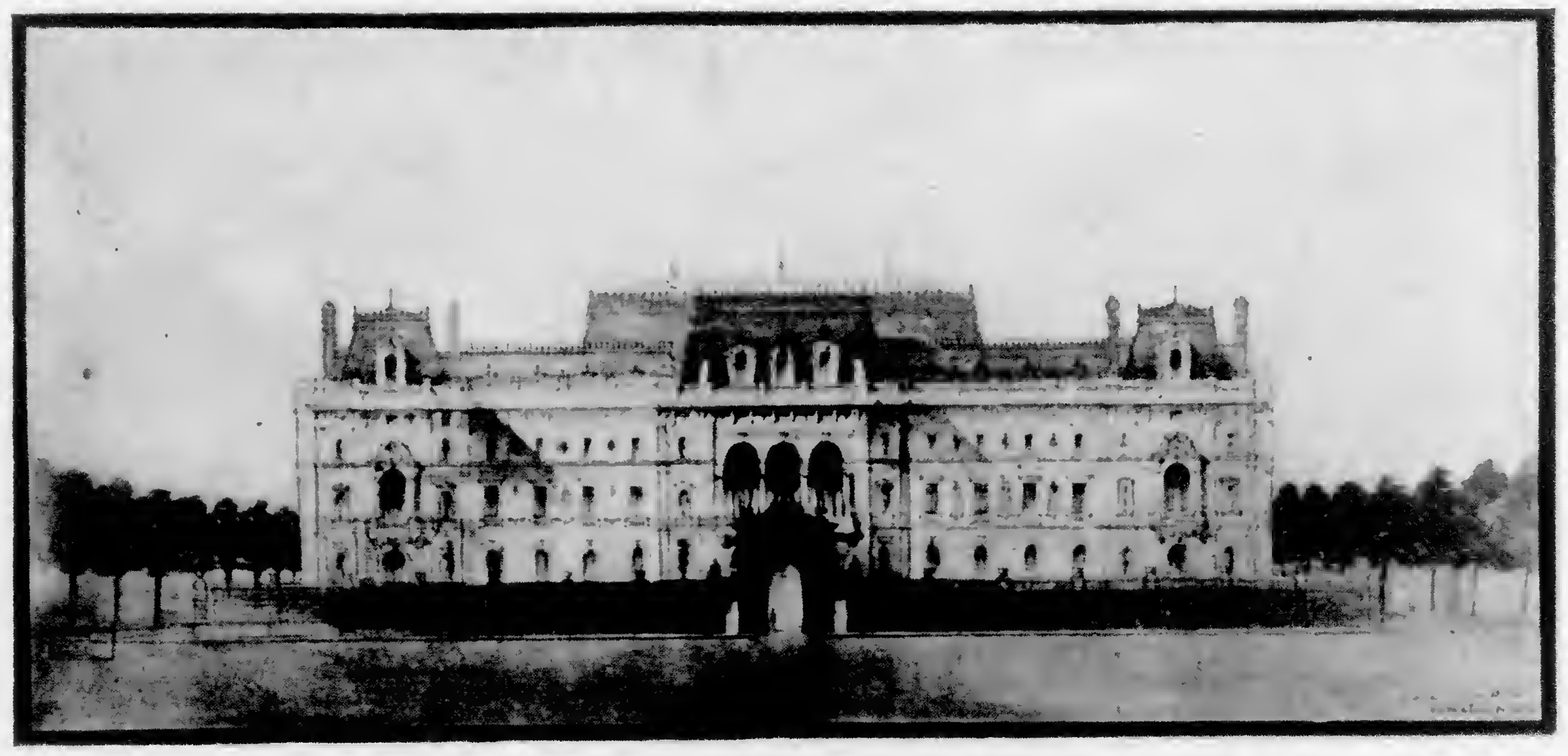
By L. E. BOYLE

WHY is so little attention being paid to the crying need for waterproofing in connection with building work? Every possible precaution is taken against fire, while but scant consideration is given to that equally dangerous and far more insidious foe—water. Before the advent of steel framing and reinforced concrete the need for this protection could be neglected with more or less impunity; the use of steel, however, has introduced new problems, radically changing the whole situation and making the exclusion of moisture a matter of vital importance. Once let the integrity of the metal become affected by corrosion and there is no telling where the mischief will end or what disaster may follow. In view of this it would be but natural to assume that every precaution would be taken to give to structures the utmost degree of waterproofness possible, and that no reasonable expense would be allowed to stand in the way, especially as the steel must be hidden away where it cannot be subjected to periodical inspections. As a matter of fact less than a tenth of the thought and care that is given to fireproofing is usually bestowed on waterproofing, and in many cases the need for the latter is utterly ignored. When some catastrophe results from this blind disregard of consequences the subject will receive the attention it deserves. But in the meantime buildings are going up in large numbers without this all-important protection. It will be too late to waterproof them properly after they are finished, for perfect work requires planning conjointly with the planning of the building. It also requires the carrying of the waterproofing completely under and around the foundations, thus enclosing and insulating them in a watertight box. Obviously this must be done, if at all, when the foundations are being laid.

Unfortunately there exists a widespread but utterly mistaken impression that concrete is in itself waterproof. This impression is much less general amongst engineers than amongst architects. It is hard to understand how it can exist at all, as but little investigation is needed to show how unfounded it is. Concrete which is always exposed to the air will never be waterproof. To understand this one has but to remember that hydraulic cements are mineral glass, which swell and harden under water, and thus fill the voids of the aggregate. So long as the concrete remains under water this condition continues. If, however, it is only part of the time under water and exposed to the air for the rest of the time, it becomes very difficult to keep it waterproof.

The absorptive power of ordinary concrete is from 2 per cent to 25 per cent, of its weight of water. If by the use of proper materials and well-proportioned mixes we produce concrete having only 2 per cent of absorptive power, practically no moisture would be apparent on the side exposed to the air if little or no pressure of water existed on the opposite side. In such a case a superficial observer would pronounce the material waterproof. If, however, any steelwork is embedded in the concrete it should always be borne in mind that the presence of even 2 per cent of moisture is sufficient to set up corrosion of the metal. The elements entering into the making of concrete, such as the quality and proportion of the materials, the amount of water employed and the manner of mixing and placing the concrete, are all factors that vary so greatly that no two batches of concrete are ever exactly alike. It may be taken as practically impossible to secure a mass of concrete having even a uniform

Perspective Exterior St. Luke's Church, San Francisco, Sutton & Weeks, Architects



Elevation American Embassy, Paris, M. H. Whitehouse, Architect

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The Neglect of Waterproofing

By L. E. BOYLE

WHY is so little attention being paid to the crying need for waterproofing in connection with building work? Every possible precaution is taken against fire, while but scant consideration is given to that equally dangerous and far more insidious foe—water. Before the advent of steel framing and reinforced concrete the need for this protection could be neglected with more or less impunity; the use of steel, however, has introduced new problems, radically changing the whole situation and making the exclusion of moisture a matter of vital importance. Once let the integrity of the metal become affected by corrosion and there is no telling where the mischief will end or what disaster may follow. In view of this it would be but natural to assume that every precaution would be taken to give to structures the utmost degree of waterproofness possible, and that no reasonable expense would be allowed to stand in the way, especially as the steel must be hidden away where it cannot be subjected to periodical inspections. As a matter of fact less than a tenth of the thought and care that is given to fireproofing is usually bestowed on waterproofing, and in many cases the need for the latter is utterly ignored. When some catastrophe results from this blind disregard of consequences the subject will receive the attention it deserves. But in the meantime buildings are going up in large numbers without this all-important protection. It will be too late to waterproof them properly after they are finished, for perfect work requires planning conjointly with the planning of the building. It also requires the carrying of the waterproofing completely under and around the foundations, thus enclosing and insulating them in a watertight box. Obviously this must be done, if at all, when the foundations are being laid.

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The absorptive power of bricks is well understood, but even where these are used we still find as a rule waterproofing is conspicuous by its absence. When it is employed it is usually something ill-adapted for the purpose and incapable of standing the test when it comes. The bricks therefore are continually in a more or less water-soaked condition. What must be the effect on the embedded steel? No application to the metal of any waterproofing paint can protect indefinitely, especially under such conditions. The only safe course is to effectually and permanently shut out moisture from the whole foundation. This can be done; is it not time to make it the universal rule?

In the case of large buildings where steel-frame construction is to be employed it is usual to call in a consulting engineer, experienced in such work, to advise as to the design, proportions, etc., of this branch of the work. It is also usual to draw on the special knowledge of the sanitary engineer, the heating engineer and the electrical engineer. The work of the waterproofing engineer ranks in importance with the very first of these. The knowledge and experience of the consulting engineer is required to design steelwork which will be safe. The knowledge and experience of the waterproofing engineer is no less necessary to design and provide means for keeping it safe. Must we wait for some disaster to bring this truth home to us?

Apart from the danger of corrosion in the steel work much might be said of the damage caused to brick, stone and concrete work by the action of the elements, which results in a gradual disintegration. It needs but a short walk through our streets to see abundant evidence of this. Few also realize how much of illness is attributable to the water-soaked conditions of foundations and walls. Or how much these water-soaked walls contribute to the difficulty of making a building warm in winter.

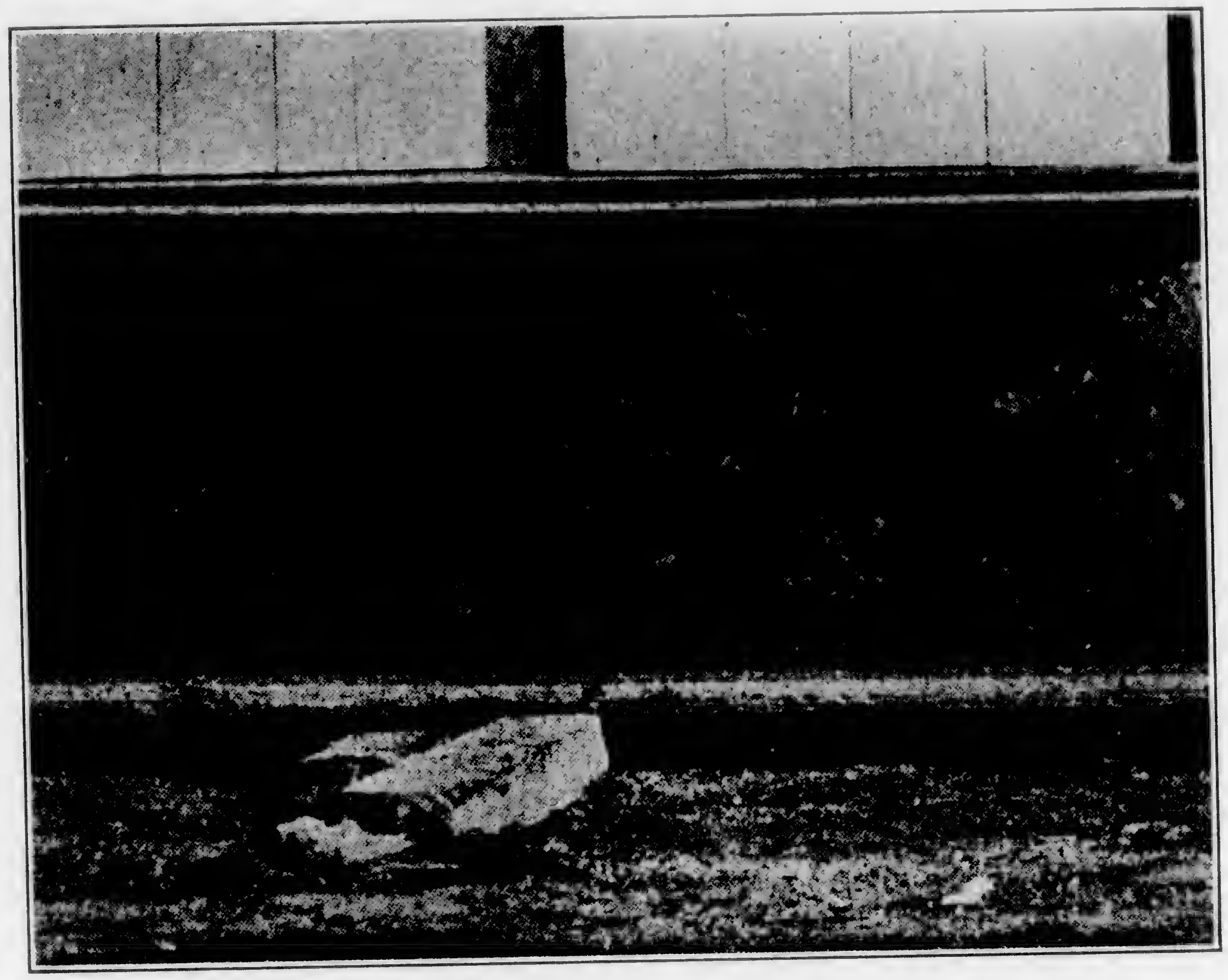
The fact is that while we have been making rapid strides in all other branches we have been standing still in this all-important matter of waterproofing. We have been blind alike to its necessity and its possibilities. Is it not time to bring this department abreast of other departments of building construction?

* * *

Lives there a man with soul so dead
Who never to himself has said:
"With half his chance, I, too, would be
As rich a man as old John D."
—New York Press.

* * *

Dear little Maudie awoke about 2 o'clock the other morning and asked mamma to tell her a fairy tale. "It's too late, darling," mamma replied. "Daddy will be home shortly, and he'll tell us both one."—Philadelphia Inquirer.



A Cracked Beam

Failures of Steel Beams

By SAMUEL M. GREEN, C. E.*

I HAVE recently had a peculiar experience with some structural steel which I think may be of interest. I am constructing a power house at Fall River, Mass., for the American Thread Company, and used for the boiler house roof 65-lb., 20-in. standard I-beams, their length varying from 25 to 30 ft.

In unloading the first shipment of these beams they were rolled off the side of a flat car, falling about 4 ft. onto level soft earth. One of the beams was broken as shown in the illustration herewith. The break was perfectly straight and extended from one flange, through the web, to the opposite flange. The fracture was perfectly new and showed no signs of defects. It was also found that a crack had developed from some rivet holes in the top flange, running from the rivet holes to the outside of the flange.

In handling two other beams of this same shipment they were tipped off some timber rolls, dropping about 6 in. to the ground, and in handling in this way the beams developed cracks in one of the flanges, in each case through a section where rivet holes had been punched. These cracks extended from one side of the flange to the opposite side and into the web slightly.

The manufacturers of these beams examined them, took samples from them and reported in a few days that they were absolutely unable to assign any cause for the beams acting in this peculiar way, that both chemical and physical tests showed them fully up to standard specifications.

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* Mr. Green is an engineer of recognized ability and has superintended the construction of several large manufacturing plants in Massachusetts. His present residence is Holyoke, Mass. The article printed herewith was written for Engineering Record.

I decided to use the balance of the shipment that showed no signs of fracture, after testing them under full load conditions. In order to do this I built a platform and loaded it with brick, and then placed a beam under the platform and raised the load on it, thus bringing the maximum strain upon these beams. They all withstood this test, even the ones that had cracked through the flange, and as I was in a great hurry to get the roof on the boiler house I accepted them and have used them. The three beams that showed rupture have been replaced.

I have had chemical analyses made of the beam that cracked, taking samples from twelve different points, Nos. 1, 2 and 3 being at one end; Nos. 4, 5 and 6 at one side of the crack, Nos. 7, 8 and 9 at the other side of the crack, and Nos. 10, 11 and 12 at the second end. These analyses are as follows:

No.	C.	Mn.	P.	S.
1	0.21	0.60	0.102	0.045
2	0.21	0.61	0.099	0.048
3	0.21	0.61	0.1004	0.059
4	0.22	0.64	0.111	0.054
5	0.21	0.62	0.112	0.052
6	0.21	0.65	0.133	0.071
*7	0.22	0.66	0.123	0.065
8	0.19	0.64	0.131	0.062
9	0.22	0.65	0.133	0.06
10	0.19	0.61	0.114	0.057
11	0.23	0.62	0.137	0.064
12	0.22	0.63	0.133	0.073

* A determination of the silicon at this point was also made, giving 0.014.

These analyses all show very high percentage of phosphorus and it seems to me this is where the trouble lay.

I shall be glad to know from your various correspondents whether or not they have ever experienced anything of this kind with structural steel, and I would also like to know if there is any way that one may be sure of not putting such material into structures. It seems to me there ought to be some method devised so that each and every beam could be carefully tested, if we are going to receive such material from reputable manufacturers.

* * *

A Hanging Concrete Stairway

THE manifold and novel uses to which cement is now put are a constant source of amazement to the general public. Among the most interesting of these uses is the construction of hanging concrete stairways. The illustration, Fig. 1, from Municipal Engineering, shows a view of a hanging concrete stairway constructed by Messrs. Milligan and Miller, architects, in the Milligan and Miller building, a white marble structure, in Wilkinsburg, one of the best sections of Pittsburg, Pennsylvania. The stairway is constructed entirely of concrete, composed of one part Dexter Portland cement, two parts sharp sand, five parts clean, screened cinders, reinforced with expanded metal.

This stairway runs from the first to the third floors, and is not supported by any structural iron work whatever. It supports a weight of over 7,500 pounds of marble work, and in addition to this a load of 2,000 pounds has been taken up the stairway, without its showing any deflection or injury.

The construction of this stairway was very simple, and is illustrated in Fig. 2. Small channel bars ¼ inch by ¾ inch were spaced about four inches apart and covered with expanded metal lathing, embedded in concrete composed as above stated. The false work was removed two weeks after the concrete was put in place, and the architects state that at that time the concrete was so hard that it was impossible to drive a steel spike into it.

The practicability of these stairways has been demonstrated. After six years of use, this stairway is in perfect condition.

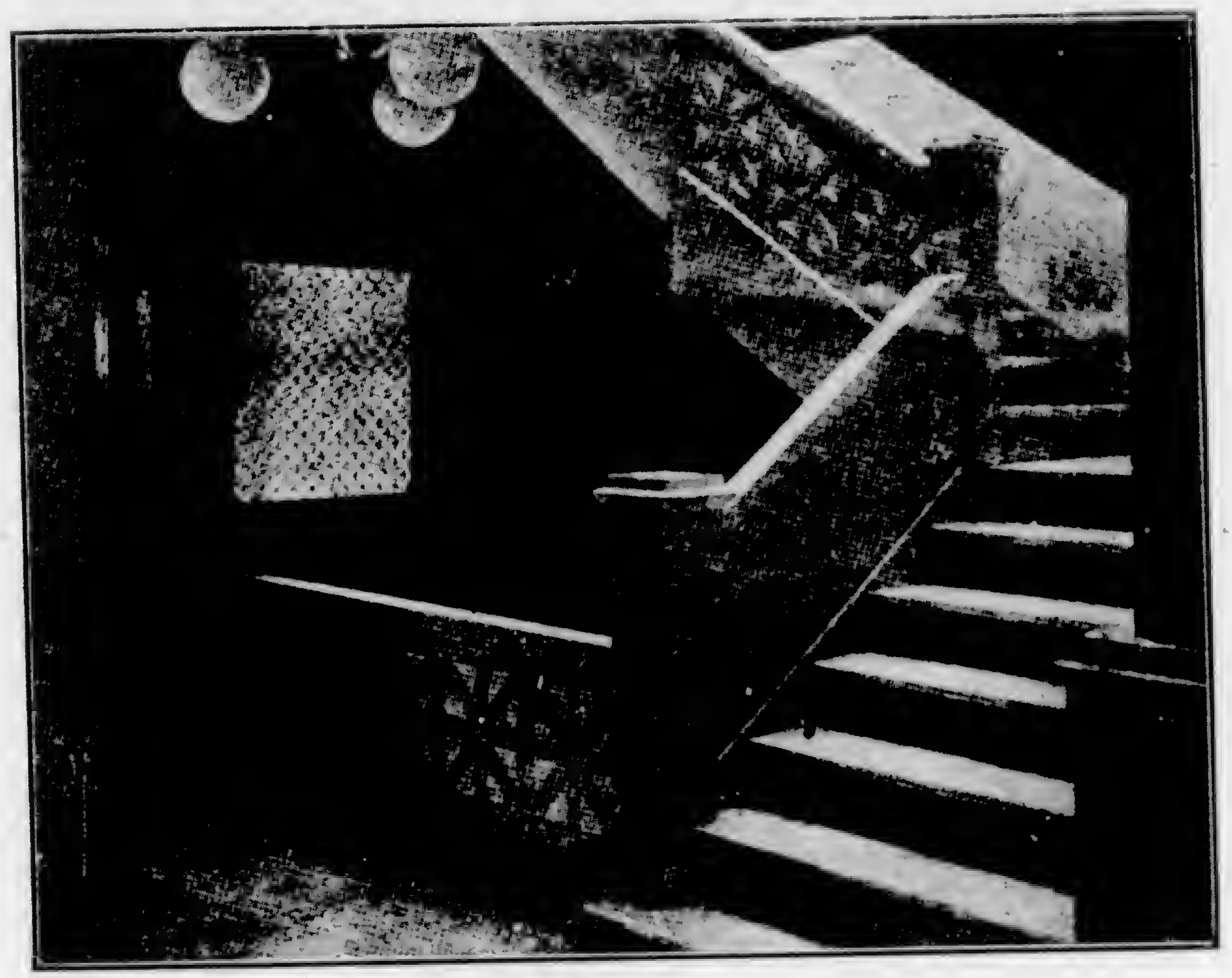


Fig. 1. Concrete Stairway
Milligan & Miller, Architects

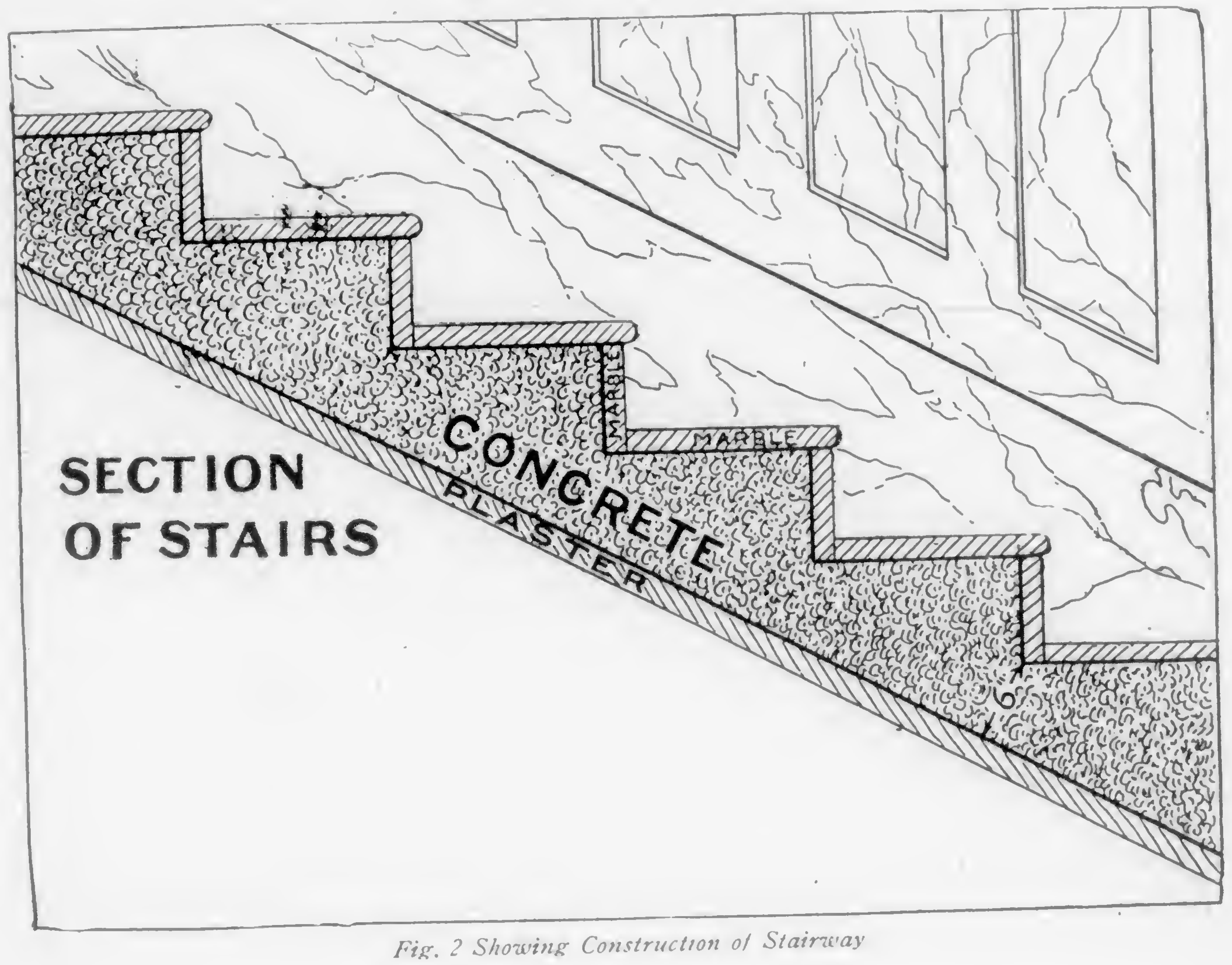


Fig. 2 Showing Construction of Stairway

The Parker Building Fire

By F. W. FITZPATRICK, Architect

THE engineers and fire experts who have examined the Parker Building in New York, the scene of the latest fatal and big fire, have completed their report to the Fire and Building Departments and other organizations. It appears that that building was of the numerous class called by courtesy "fireproof" and whose structures are, for that matter, non-combustible, but that offer little protection to their contents and are damageable all the way from 5% to 90% of their cost value, a class absolutely distinct and different from the big skyscrapers of New York and the really fireproof buildings of the first class.

Its outer walls were of stone, brick and terra cotta, its skeleton of cast-iron columns and steel beams and the floor filling of fireproof hollow tile. But the steel beams were unprotected by tile in their most vulnerable parts, the lower flanges, so were the girders unprotected; the elevator shafts and stairways opened into every story; iron shutters of an inferior order protected only a few of the windows; the water-supply permitted the firemen to reach only the fifth floor. The building was put up for light office purposes but was occupied as a manufacturing plant and loaded with machinery and filled with the most combustible of materials; most of the partitions were built upon the wooden sleepers in the concrete filling of the floors. The fire virtually had to burn itself out unchecked. Yet it was not a total collapse and its materials being incombustible it was essentially a fire of the contents and it was kept within the building in which it originated. With the water pressure as it was, had that fire been in some of the old-fashioned all exposed steel and wooden-joisted buildings it might have been the beginning of a colossal conflagration.

Some alarmists see in this fire a threatened danger to the great skyscrapers of our larger cities. Where any of these have been built by architects and engineers not competent to do really fireproof work and in cities whose building codes permit such unscientific putting together of however good materials, there that danger lurks; but where those tall buildings are constructed as are the best in New York, with every particle of the steel frame thoroughly protected from fire by hollow tile of other adequate protection, and where the stories are isolated one from the other by enclosed elevator and stair shafts and where the external openings are protected by metal sash and wire glass, there exists not the slightest danger of any such disastrous fire for, whatever the contents of the building, fire originating upon any one story cannot possibly extend beyond that floor. A thirty-story well-built skyscraper is as safe as would be thirty-one story absolutely fireproof buildings on the ground.

But this lesson should not be without its effects. It should certainly tend to lessen the opposition that exists in most of our cities against more stringent building regulations and their strictest enforcement. If left to their own devices there are probably as many people willing to exercise the "economics" practiced in the Parker building as there were at the time it was built ten years ago. It is imperative that the cities should compel really fireproof construction and further that in the second class and old buildings of the Parker stripe adequate provision should be made, in the way of enclosing shafts and protecting windows and supplying water and hose and alarms sufficient to make it that such fatal and disastrous fires may not have to be so often recorded.

Good Roads and the Vrooman Act

By H. Z. OSBORNE, JR.,

Secretary of the Engineers and Architects Association of Southern California

MOST of the street work in and about Los Angeles is constructed under the Vrooman Act. This is the general street law of California. The law is extremely technical—its provisions being rigid in the extreme. Both features strongly affect the engineering work and both tend to limit the effectiveness of the work done under the State law. Strictly speaking, the plans, profiles and specifications should be complete in every detail before the Ordinance of Intention to do the work is presented. Every possible obstacle should be foreseen and provided for. The work should be carried through without deviation from the original plans. Aside from the legal questions involved from a change in plans, the question always arises most inopportunely: "Who will pay the extra cost arising from the change in plans?" The law makes no provision for this extra cost. It is questionable whether any law could be framed to cover this objection and at the same time be constitutional. Each improvement must be accurately described in the Ordinance of Intention to do the work.

What happens if the street assessment is invalidated by reason of some defect in the proceedings even though the contractor has constructed his work in good faith? The property holders may refuse to pay their assessments, thereby ruining the contractor or his backers.

From what has been briefly suggested, the importance of the preliminary work is forcibly brought to one's attention.

This preliminary work will be briefly considered in the following order:

Field work—(a) Surveys; (b) Profile.

Office work—Specifications—(a) Profile; (b) Plan; (c) Cross sections; (d) Standards.

The preliminary survey for paving work locates the property on the street for the benefit of the assessment diagram; the improvements which will be affected by the new work, and the center lines of the main street to be improved as well as the cross streets.

In the profile of the street, elevations are taken on all curbs, walks, permanent gutters and other special work which will affect the pavement. The necessary cross-sections of the street are taken when the profile is run. These field notes are turned into the office and from them the office profile is platted. In practice it has been found most desirable to use the "single scale," 100 feet horizontal to 10 feet vertical.

The plan of the improvement is made, the location of the cross sections, culverts, stormdrains, class of pavement, gutters are each taken up in regular order. Conclusions arrived at in the office are verified by an inspection on the ground. The final plan indicates the work proposed to be done.

As a general rule it may be stated that cross-sections are taken whenever a change in surface is required in the plans. This makes it possible to merge one section into another. The surface is thereby made extremely mobile. Standard cross-sections are used wherever possible to permit the use of templets in construction work. Templets are generally made of wood or steel. A section is cut to fit the curve of the standard cross-section.

In concluding I would mention some of the standards which have been set for use in the City Engineering Department.

Grades—Asphalt, 5% maximum; vitrified brick, 8% maximum; granite block, 15% maximum; macadam, 5% maximum. Cement gutters are required on graveled streets where the grade exceeds 1%. Culverts are avoided wherever possible. Grades, .4% minimum; across street intersections, .4%.

Make Paint from Waste Brick and Terra Cotta.

A. E. WILLIAMS, of Lakewood, N. J., claims to have invented a process to utilize waste clay products such as brick, terra cotta and tile waste to manufacture a mineral paint for which he has obtained a United States patent. He has also filed application for foreign countries.

He claims by his invention to be able to manufacture mineral paint and use the best of linseed oil at one half the price of the cheapest paint that is now being sold all over the world, and still be able to make more profit on his paint than any other manufacturer.

There are, according to latest reports, 6,033 operating firms in the United States manufacturing brick, etc., and these firms are doing a business of over $140,000,000 a year, with an increase at the rate of $10,000,000 a year in clay products.

Inventor Williams says all the waste from these factories can be utilized. "There is," he says, "no known substance that will hold its color for hundreds of years as brick will. This in itself proves the fastness of this paint made from brick.

"The manufacturers of other red and brown mineral paints have to get their material from the distant mines where the iron ore is first mined, ground, treated and roasted, and this, in most part, my invention does away with."

The inventor claims to be able to make the waste clay products such as brick, etc., that are thrown aside by the manufacturers pay more profit than the brick itself. The cost of this waste, he says, is only in the handling of it. With his process, the inventor claims, one brick weighing four pounds will make 12 pounds of mineral paint, or 1,000 brick, weighing 4,000 pounds, or two tons, will make 12 tons of paint, using the best linseed oil. The paint, he says, is just as good as any mineral paint in the world.

⁂

New York's Great Fire Barrier

ACROSS the lower end of New York city the greatest fire wall in history is nearing completion. It will effectually cut off the financial district of the Metropolis from the rest of the city in case of a conflagration. Almost two blocks thick and hundreds of feet in height, this great unburnable barrier, roughly following the line of Liberty street, is formed by a chain of sky scrapers composed mostly of steel and hollow blocks of Jersey clay which have each been heated to a temperature of 2,000 degrees in the process of manufacture, and in their finished state as porous terra cotta are absolutely not burnable.

Beginning at the North river, the Central building, of twelve stories, and the West street building, of twenty-three stories, form the west end of the wall. Between Washington and Greenwich streets is a break, but it is more than counterbalanced by the Hudson Terminal building between Greenwich and Church streets, and the Singer building, the highest in the world, the City Investing and the Trinity buildings, between Church street and Broadway.

Crossing Broadway the fire-proof wall is continued by the Broadway-Maiden Lane building, the Jewelers' building and the Provident Savings Life building. East of Nassau street are the Mutual Life Insurance building, the Continental building, Royal Insurance building, Bishop building, International building and the Tontine-Tabor building, forming an almost unbroken line to Water street of structures as nearly fireproof as human art can build

Organized Labor is Creating Criminals by Restricting Apprentices

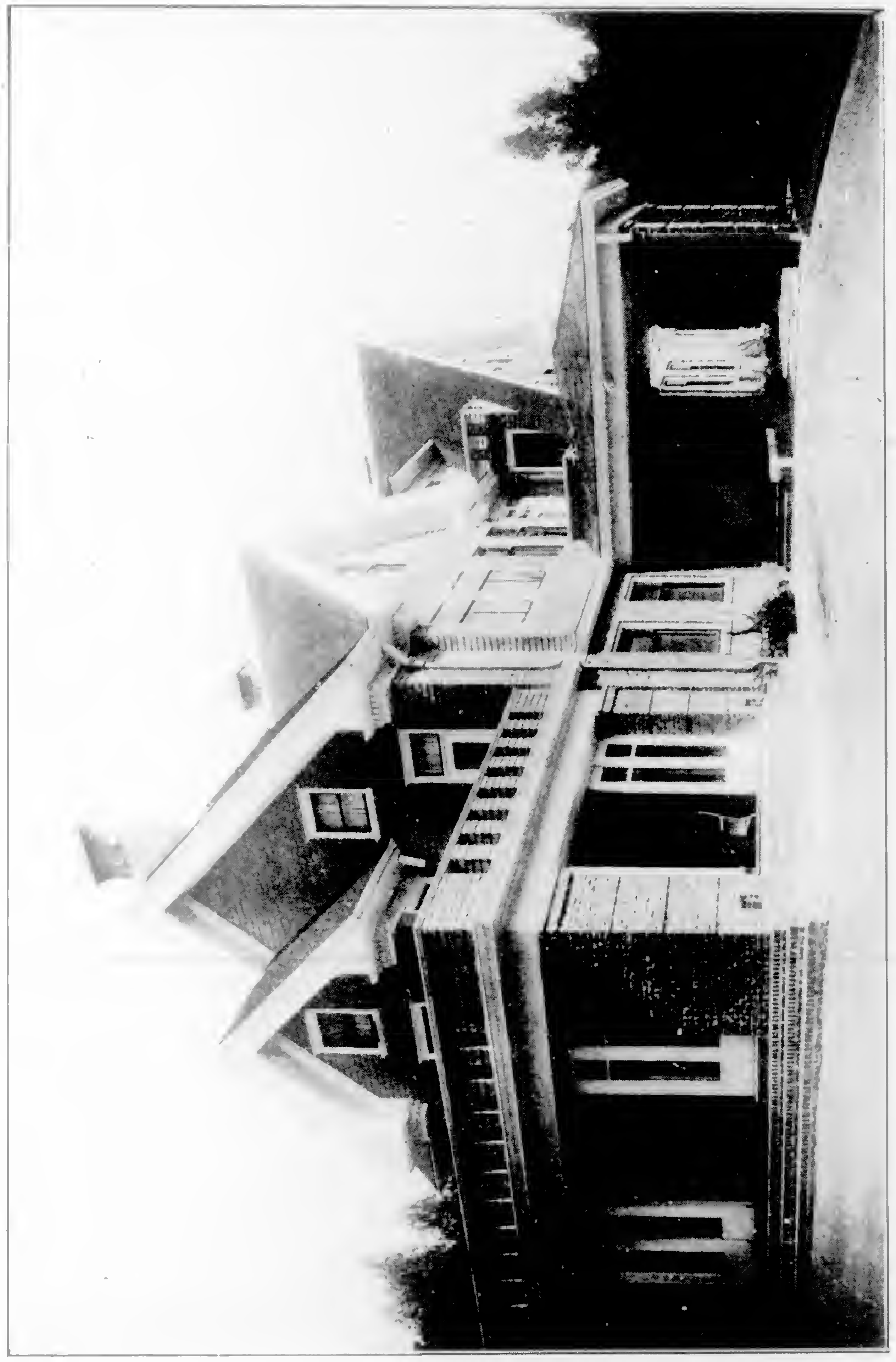
From the Western Architect and Builder.

THIS is true and cannot be successfully denied. We need not point out the serious consequences of this result to the community at large. The public well know that criminals are enemies of society. But it does seem to be a most hurtful menace to the happiness of the homes of this country, and it is a condition that will bring disgrace upon the good name and break the hearts of many loving mothers, who look forward with high hopes to the future of their boys.

We charge that organized labor, working through the several unions of the trades, has practically closed the doors of the trades of this country to our native boys, by refusing them the opportunity of learning the trades by ruling that only a very few shall enter the shops as apprentices. As an illustration of this selfish cruelty, we cite the action of the plumbers' union of San Francisco, which has ruled that hereafter only sons of members of the union will be received as apprentices to the trade. Under present conditions this selfishness may dominate other trades. Do the parents of this country, do the mothers realize the restriction of the future of their boys? Think of the mighty hosts of boys, standing upon the thresholds of their childhood's homes, ready to pass out into the world, eager to take up the burdens of life. They have been educated to believe that in this free land of equal opportunity the world is before them, and that they can achieve success. The several trades they regard as their heritage, and they seek the opportunity of learning the trade of their choice only to find it closed against them; then another and another, and so on through the weary round. Organized labor has barred the door against them. Each refusal deadens his enthusiasm more and more; the outlook on life is clouded; the hopes of the father, the pride of the mother, and the aspirations of the boy are all shrouded in gloom together, until in sheer despair he becomes a mere casual day laborer. Without a trade, he drifts, he knows not where; he becomes indifferent, then dissipated; he finds himself in the company of the vicious, daily skirting the border land of criminality, gradually associating with criminals until he is one, and as such is recognized by the world, and organized labor has added another criminal to swell the ranks of those who are enemies of society.

This is no mere fancy sketch; it is a hard, cruel result, which the officers of the law confirm. Thus in Indiana is a reform school to which are committed boys from 15 to 18 years of age. Its record shows that 95.6 per cent of the inmates were without knowledge of trades. In the same State is a reformatory where youths from 18 years up are committed, and 89½ per cent of the inmates had never learned a trade. So, also Chief Inspector Watts, of the Boston police force, testifies "that the lack of a trade was the potent and permanent cause of crime, and that not more than 2 per cent of the prisoners received in the State prisons have a trade."

The Warden of the San Quentin prison of California, when asked as to what brought most of the prisoners to his jail, replied: "Nothing to do; they are not taught to work." It may be said that this is the universal testimony. Man must work to live, and whatever agency closes the avenues to this condition in life is an enemy of his fellow men.



Country House of Mr. J. H. Follis, San Rafael, Cal.
Thos. J. Welsh and John W. Carey, Associate Architects

Driveway and Garage, Estate of Mr. J. H. Follis
Thos. J. Welsh and John W. Carey, Associate Architects

Country House of Mr. J. H. Follis

By JOHN W. CAREY, Architect.

THE country house of Mr. J. H. Follis, San Rafael, Marin county, California, has the advantage of being located on a knoll overlooking the surrounding country, with Mount Tamalpais and a charming background of trees and wooded hills.

From no place except the terrace is it possible to obtain a comprehensive view of the house; but viewed from the slope, the gabled skyline is particularly effective.

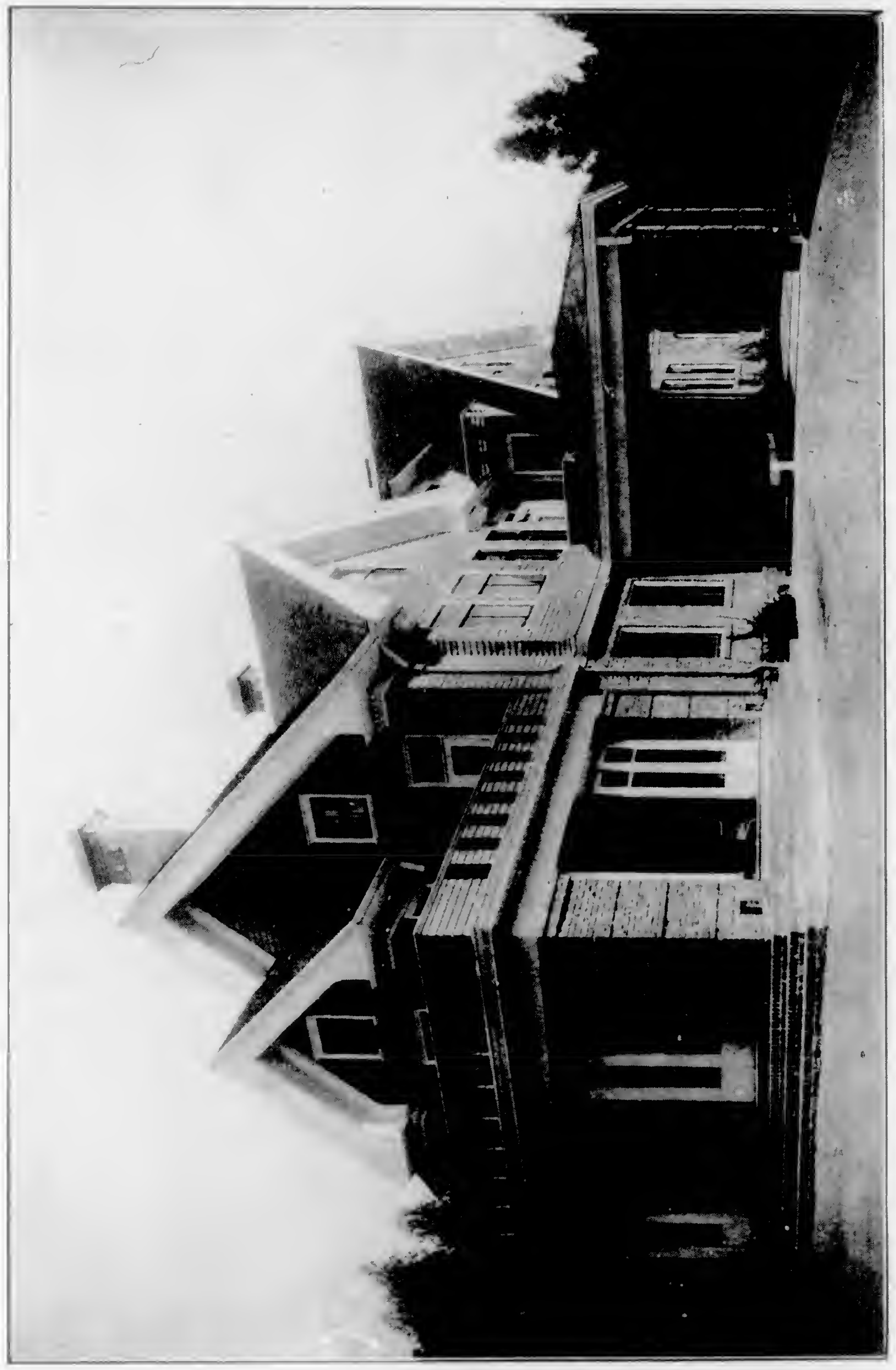
To provide room for the house, terrace and drives, the top of the knoll was graded off and the basement was blasted out of solid rock and considerable filling was necessary in constructing the main driveway. The landscape work accomplished on the premises since the completion of the house shows that the owner intends to make it one of the most attractive places in Marin county.

The lower story is built of clinker brick, while the upper story and roof are covered with cedar shingles. The walls are treated with a silver gray stain, and the roof finished in moss green.

Following the modern plan, the regulation porch was discarded and the sun parlor was adopted instead. The interior of this room is shown with this article. The room can be entirely enclosed by means of sliding glass doors and made an inside parlor, or can be thrown open on three sides. Two sliding glass doors lead from the sun room to the living room, making it possible to use the two together.

The main hall is 25′-0″x40′-0″ with a raised gallery at one end. The walls are paneled 7′-0″ high and the ceiling is beamed. The frieze and ceiling space between beams, are in dull gold.

The dining room walls are paneled full height and the ceiling ornamented with plaster ribs in a geometrical pattern.



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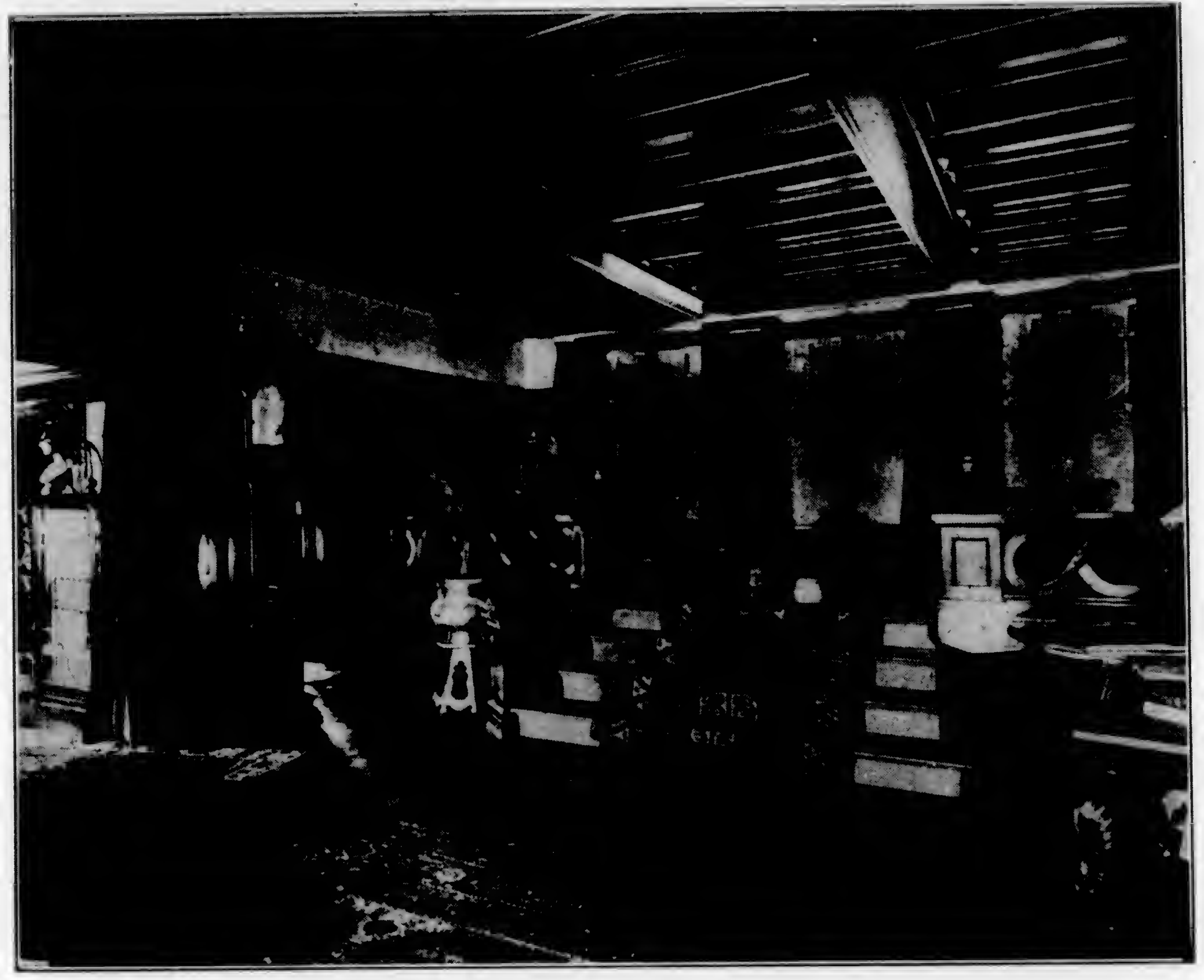
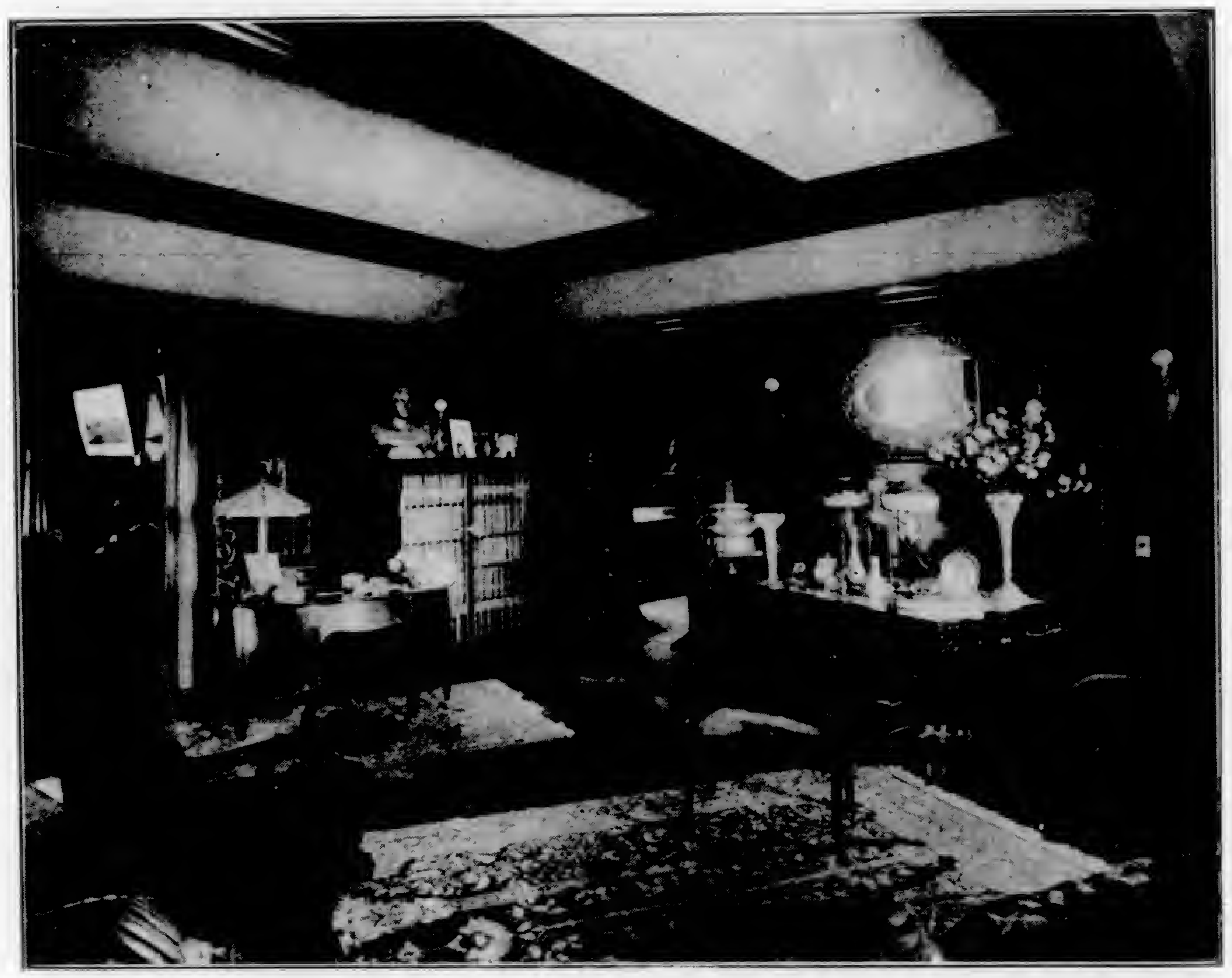
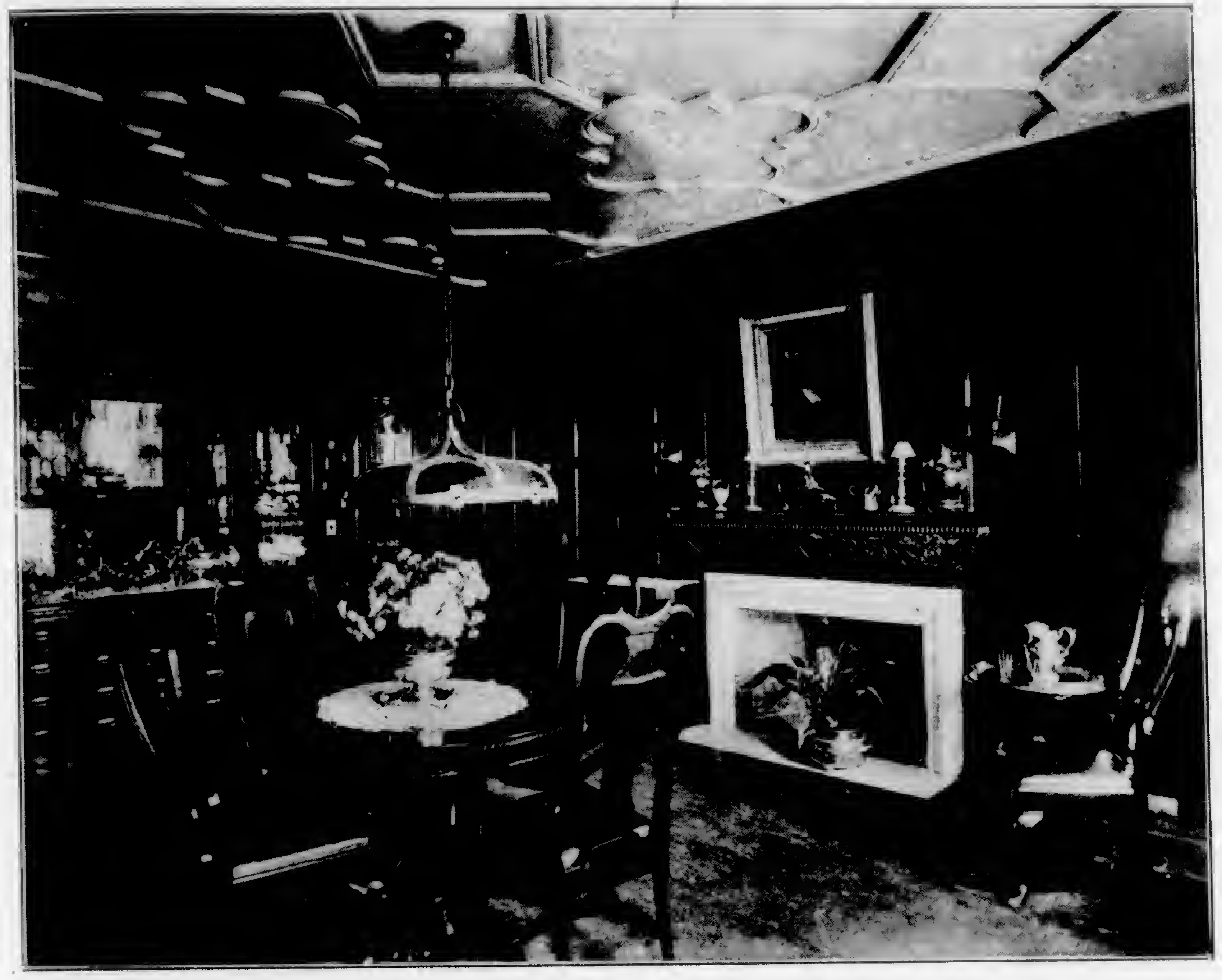


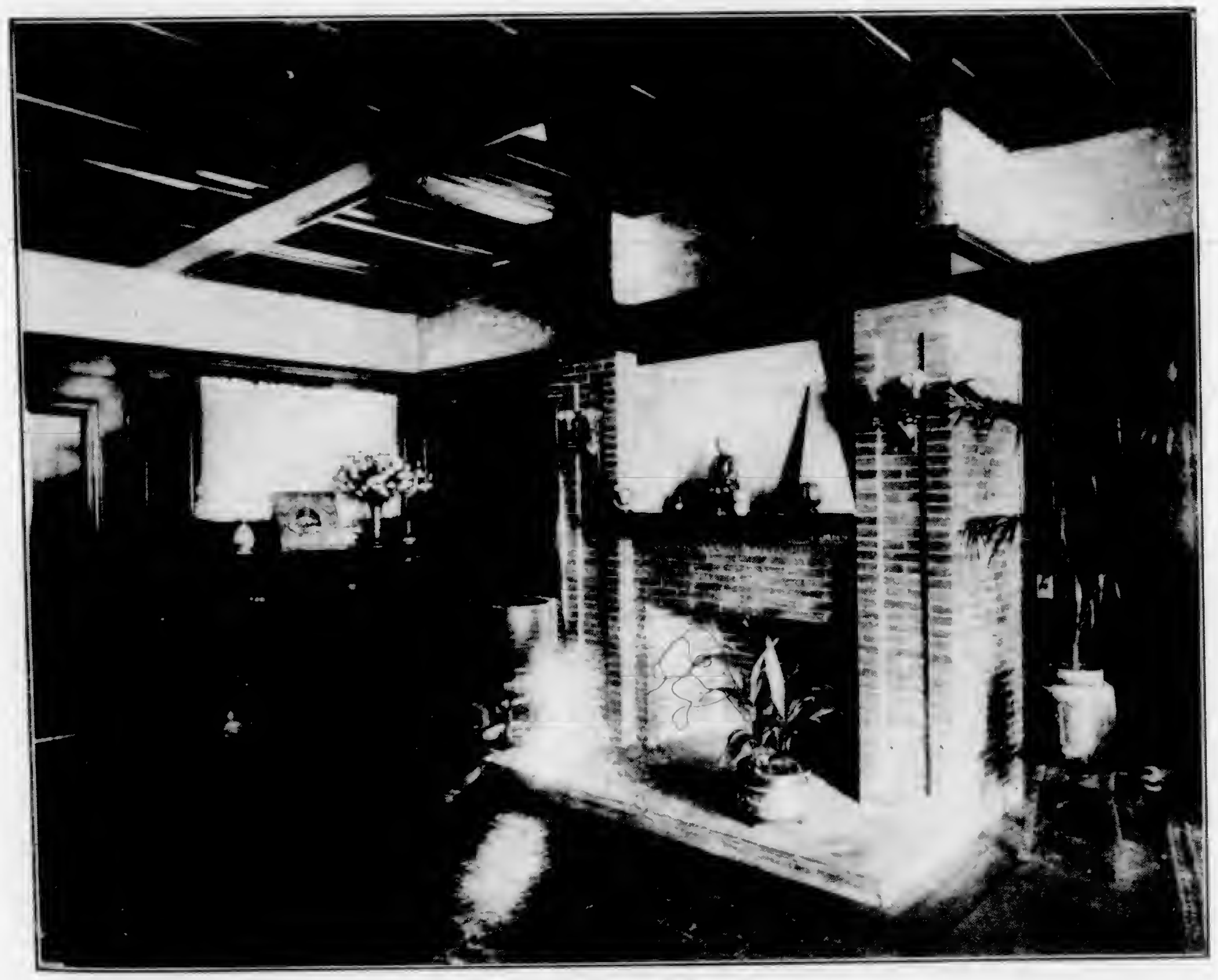
House of Mr. J. H. Follis—the Hall



House of Mr. J. H. Follis—Living Room



House of Mr. J. H. Follis—the Dining Room



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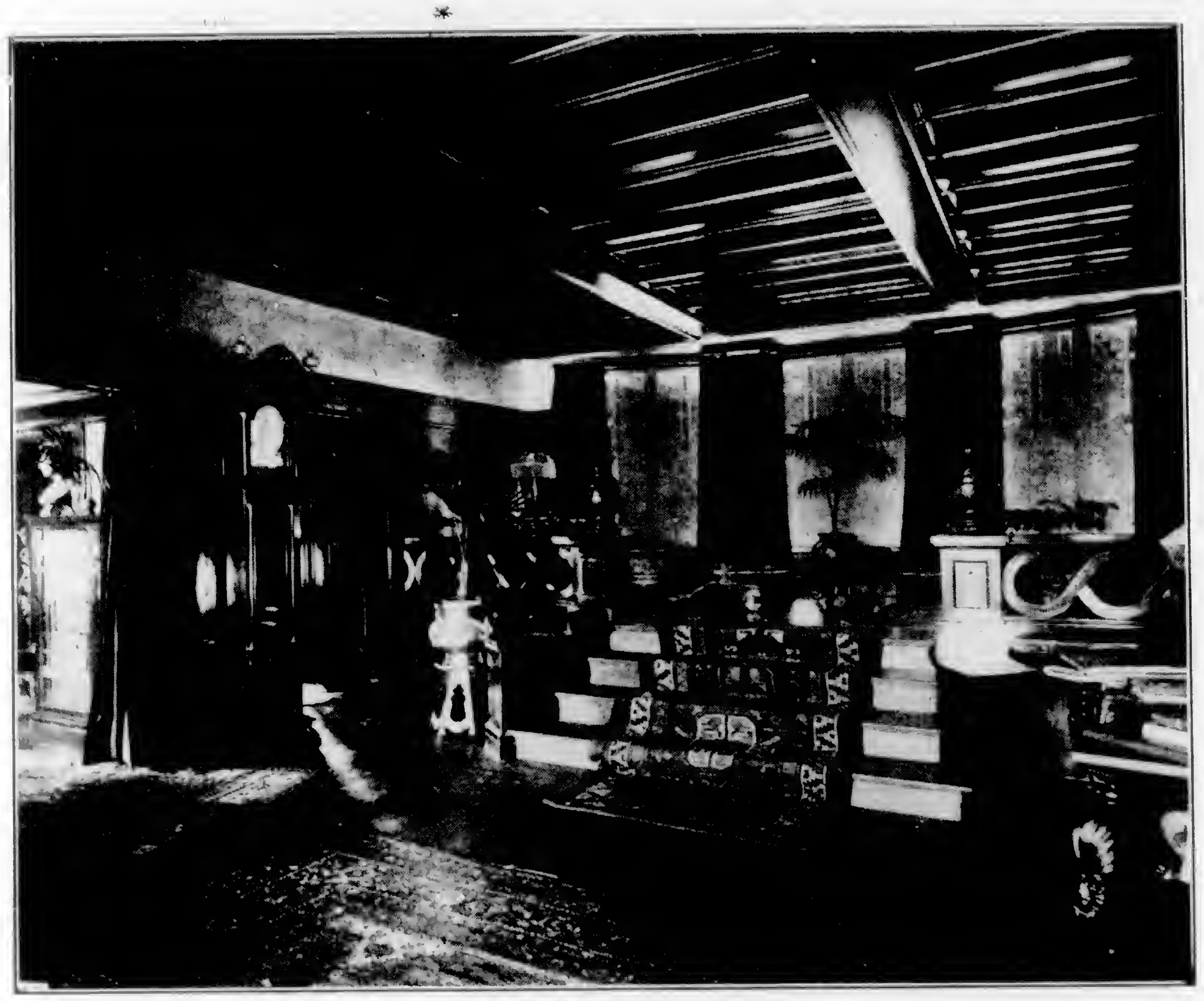

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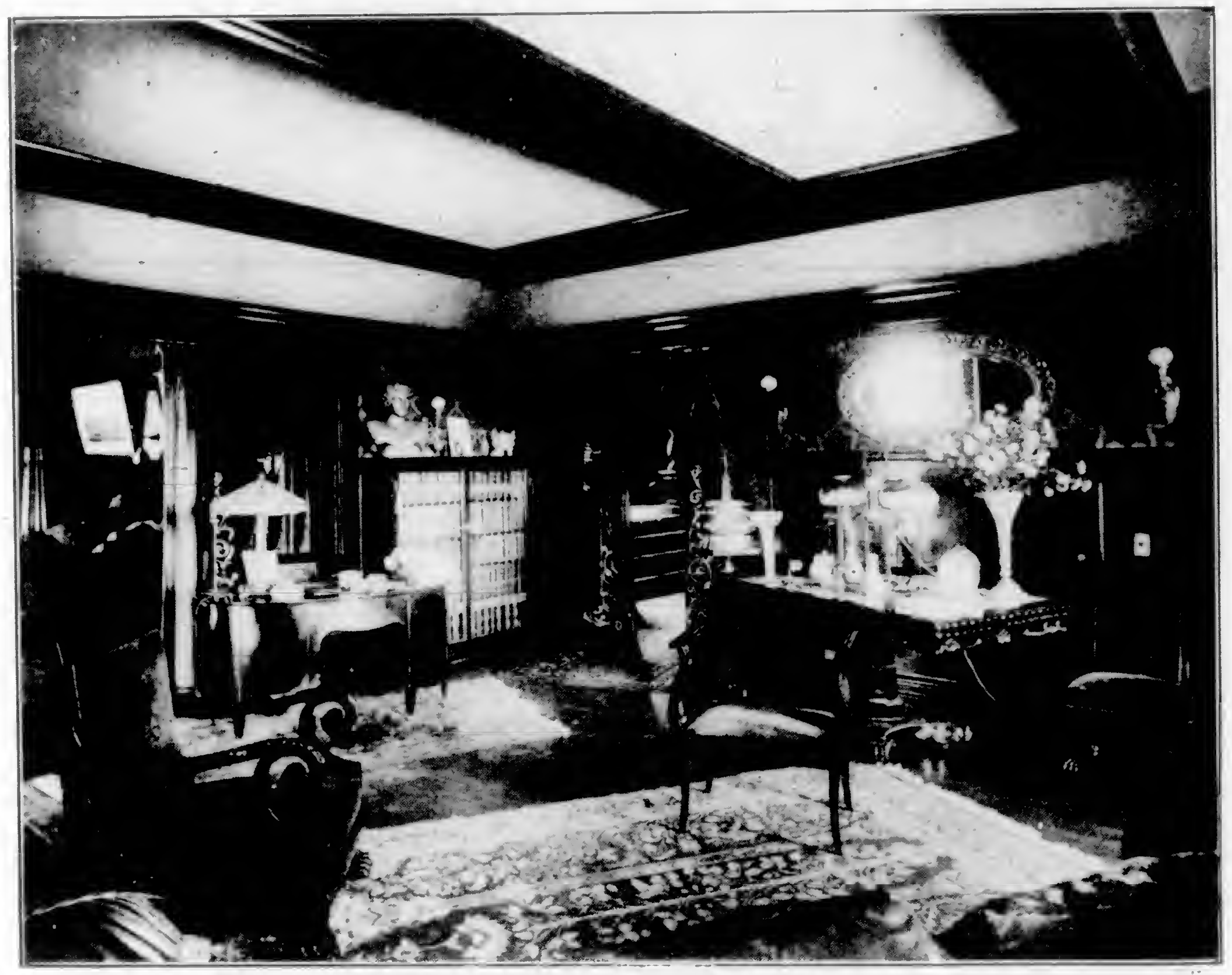
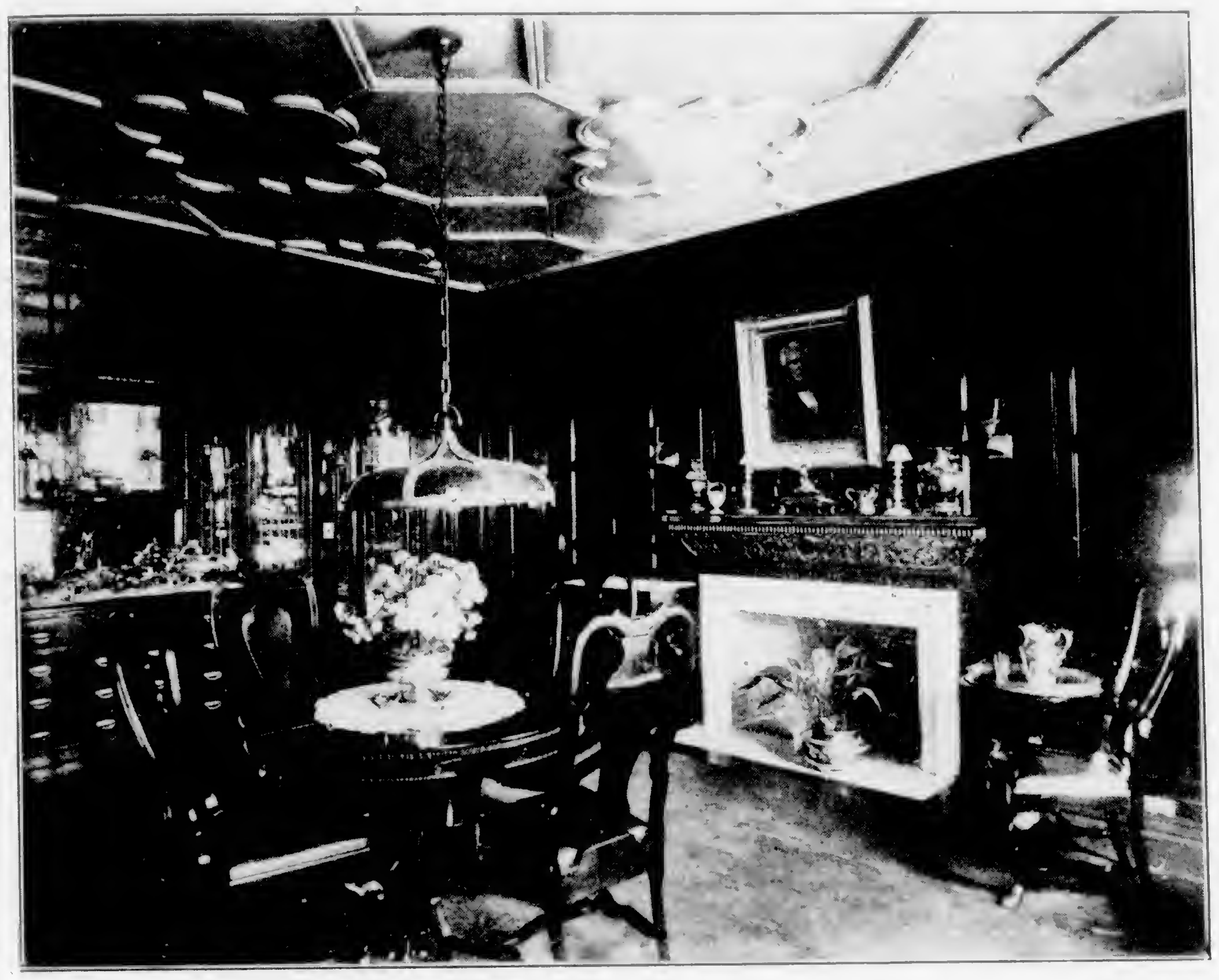


House of Mr. J. H. Follis—Living Room



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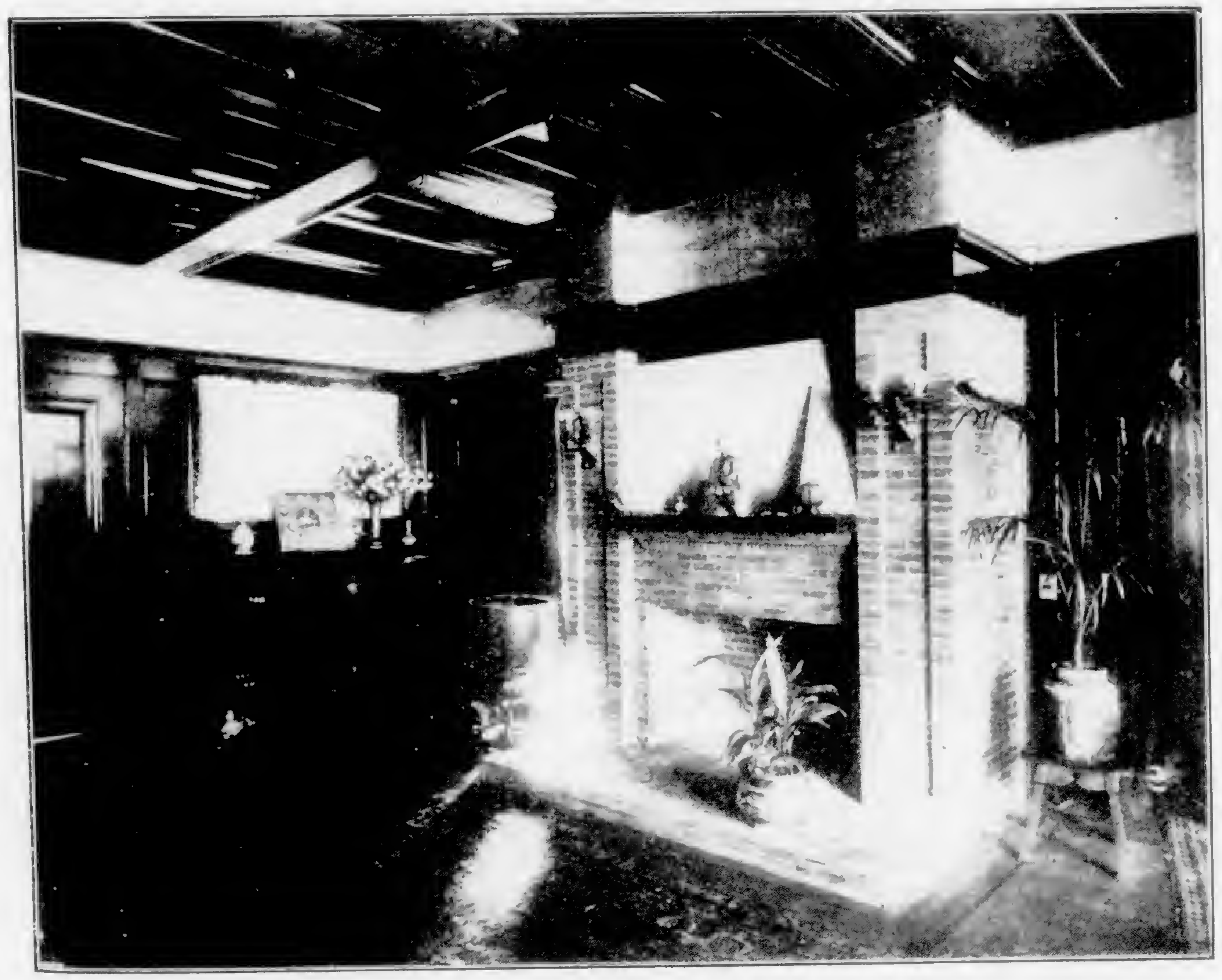

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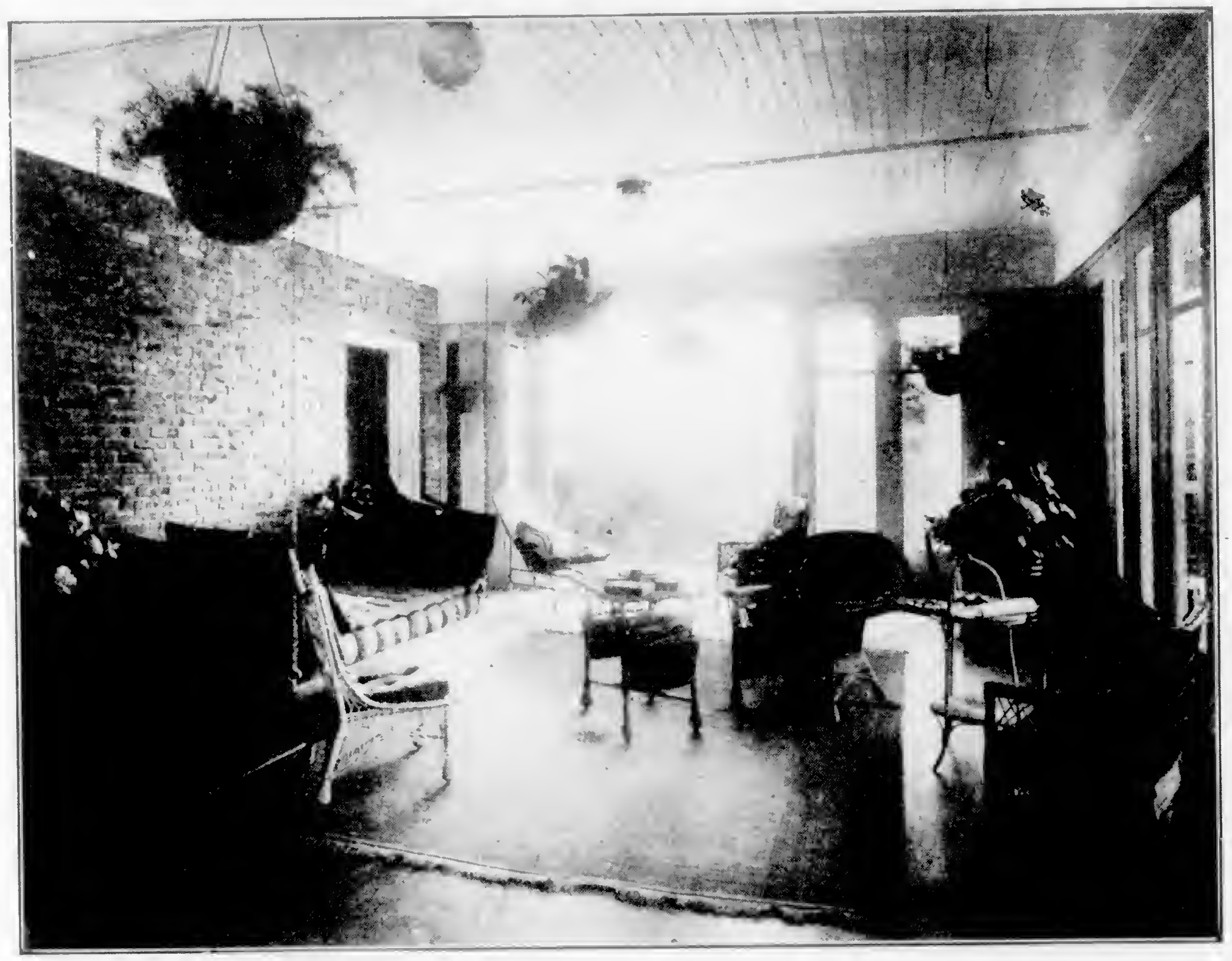
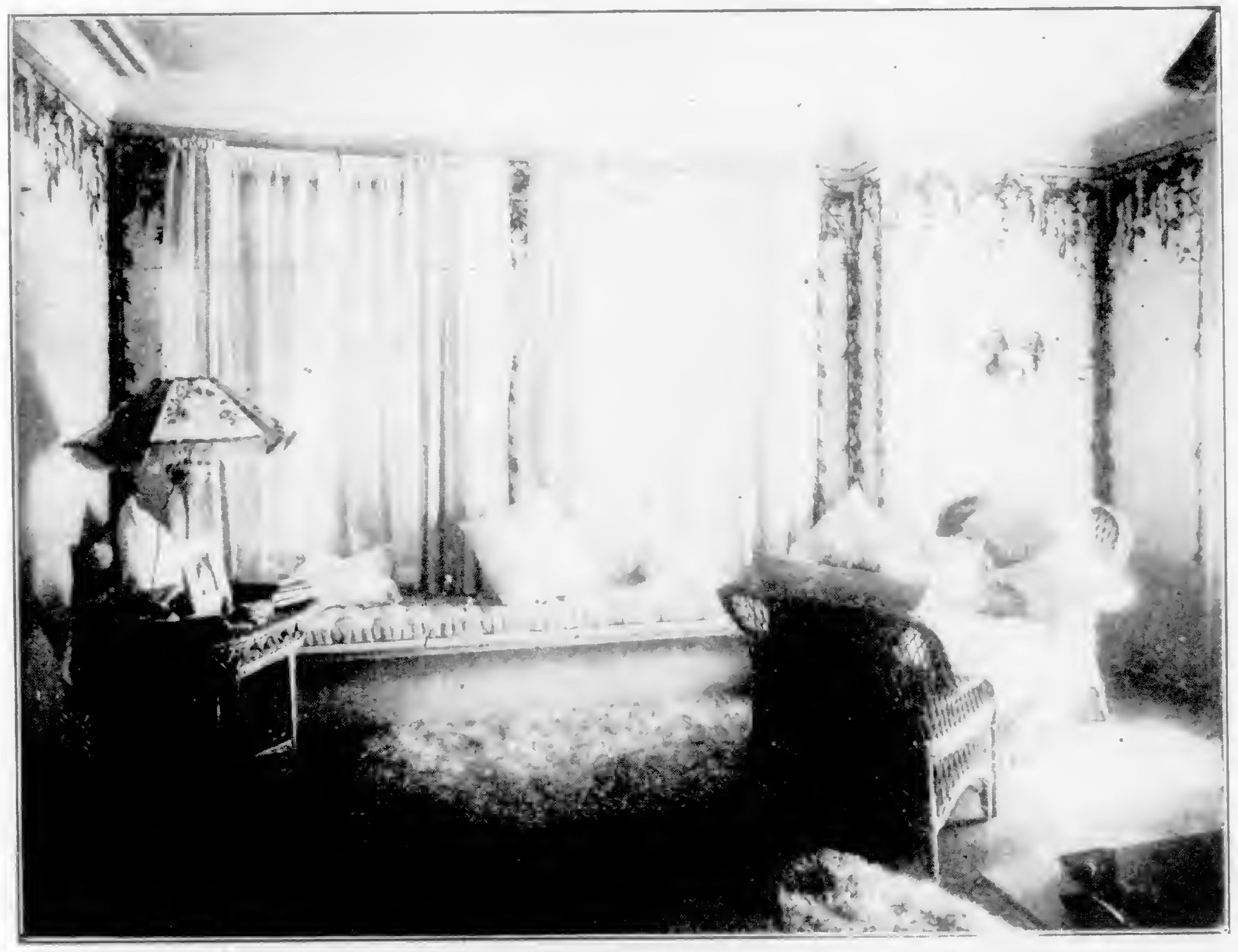


House of Mr. J. H. Follis—Interior Sun Porch



House of Mr. J. H. Follis—the Boudoir

All the mantel pieces throughout the house were specially designed to suit the finish.

The living and billiard rooms are shown in one view. The walls above the wainscot are covered with soft toned leather, and the frieze and ceiling are finished in light brown.

There is an elevator from basement to attic, and a fireproof vault in the butler's pantry.

On the second story there are five bedrooms each with its own bathroom and Mrs. Follis' sitting room and maid's room.

In the attic are more guest rooms and some servants' rooms and a large play room.

The house is heated throughout with hot water and has a most complete electric installation, including an intercommunicating telephone system.

The garage is shown at the heading of this article and makes an attractive picture with the background of trees. It contains besides the requirements for a garage, stabling for two horses, carriage barn, and two rooms and a bath for the help.

The Man Behind

In almost any newspaper
You're pretty sure to find
A lot of gush, in printer's ink,
About the man behind.

There's the man behind the counter,
And the man behind the gun,
The man behind the kodak
And the man behind the sun.

The sleepy man behind the times,
The man behind his fist,
The man, alas, behind his rent,
And so throughout the list.

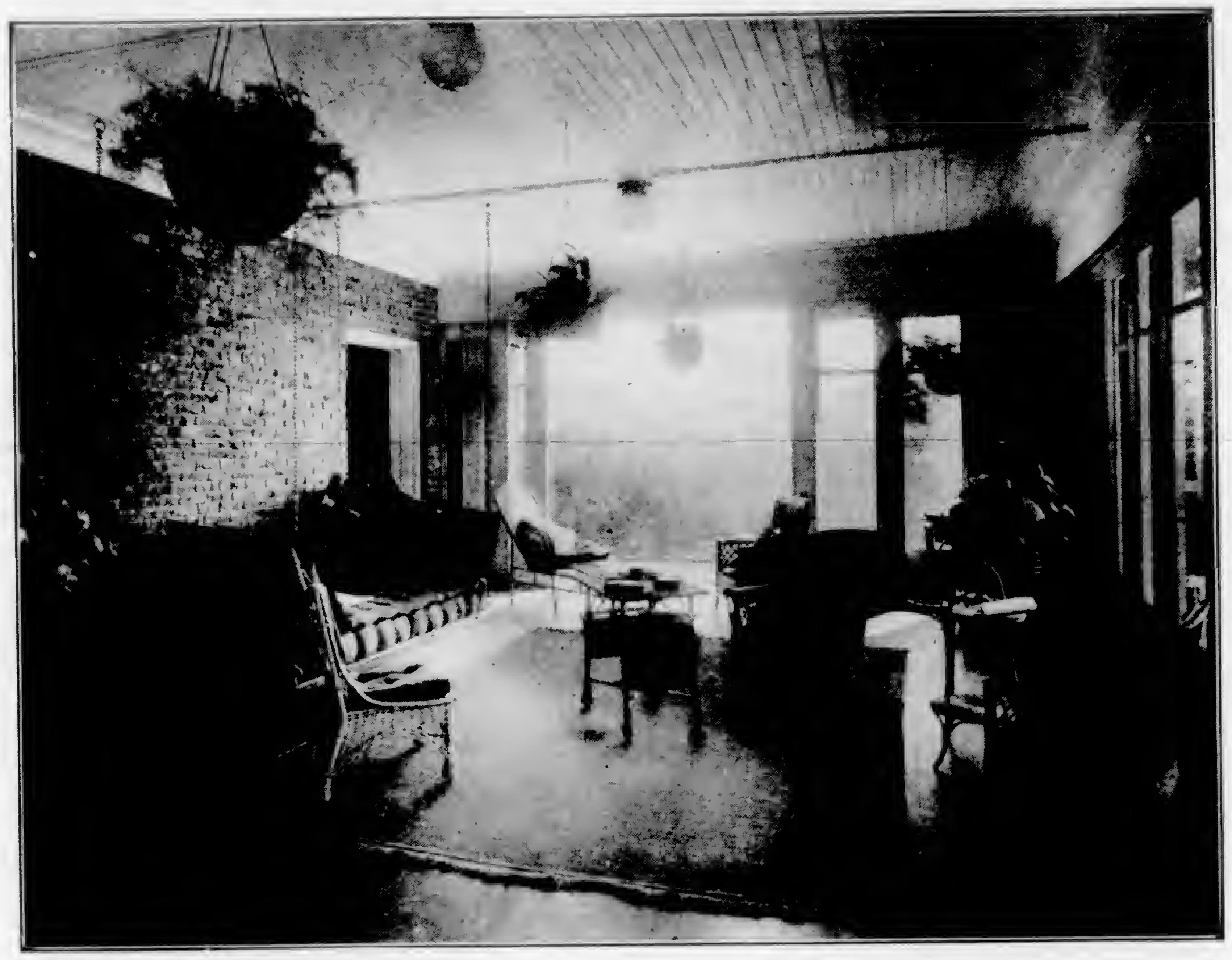
But they've skipped another fellow,
Of whom nothing has been said—
The fellow who is even
Or a little way ahead.

Who pays at once for what he gets,
Whose bills are always signed;
He's a blamed sight more important
Than the man who is behind.

All the editors and merchants,
And the whole commercial clan,
Are indebted for existence
To this honest fellow-man.

He keeps us all in business,
And his town is never dead,
And so we take our hats off
To the man who is ahead.

—Australasian Hardware and Machinery.



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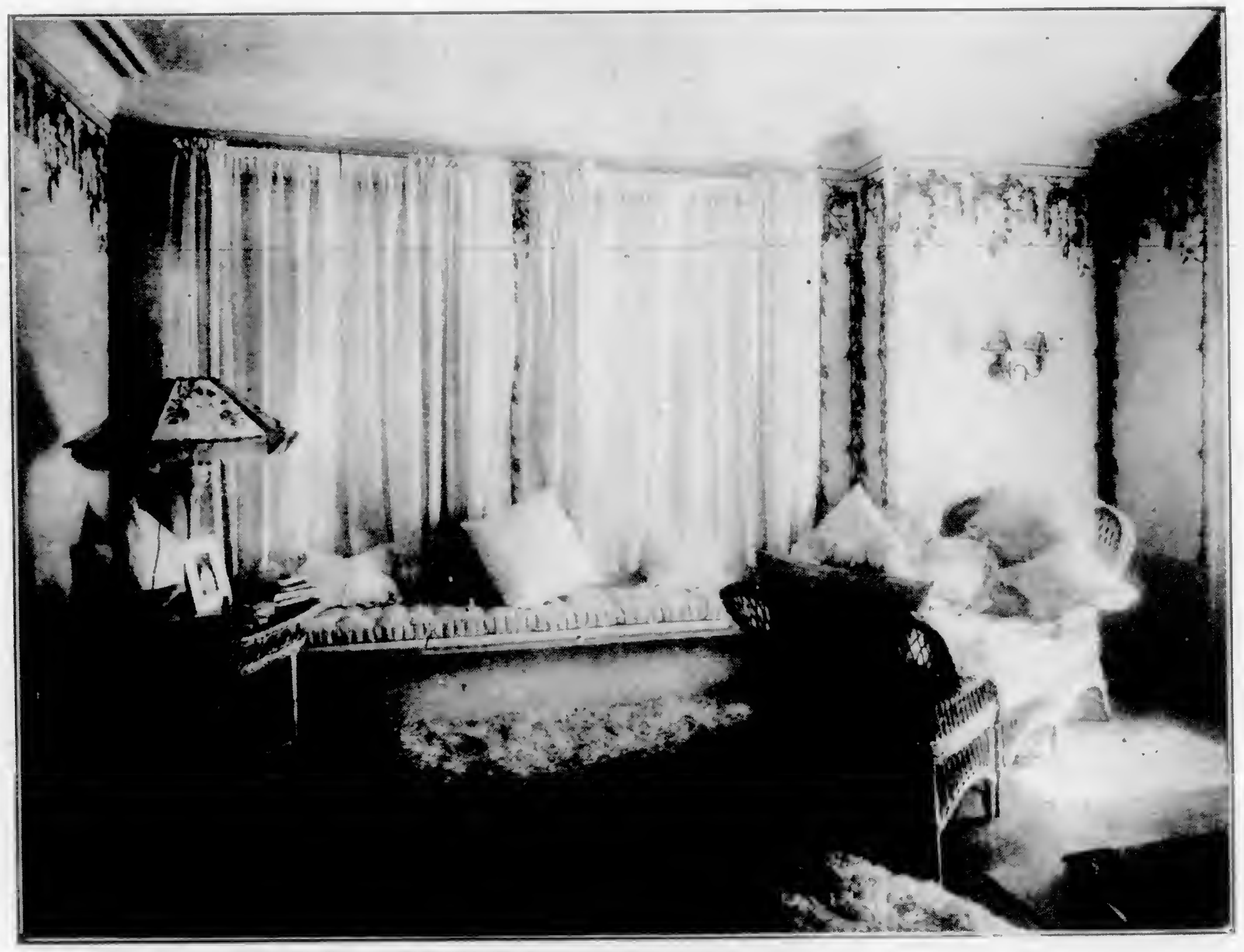

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Reinforced Concrete Floor Construction

By JNO. B. LEONARD, C. E.

THE very general adoption of reinforced concrete floors awakens particular interest in a study of their merits and faults. In a reinforced concrete building the floor construction must of necessity be of this material, but in steel frame buildings it is very generally adopted because of its easy adaptability to the various conditions, and the excellent results it yields at a minimum expense. Concrete, being cast into position in such a way as to make a monolithic or continuous mass, and possessing the characteristics of an elastic solid, is subject to all of the physical laws involved by these conditions. The result is that the designer encounters problems which seldom, if ever, arise in any of the other structural materials at his command. Its qualification of weak tensional strength demands that exceptional care be exercised to insure such conditions that will make it impossible for the concrete to ever be called upon for such strains. This safeguard is many times omitted in floor construction, which is a lack of consideration of the negative moment over the points of support.

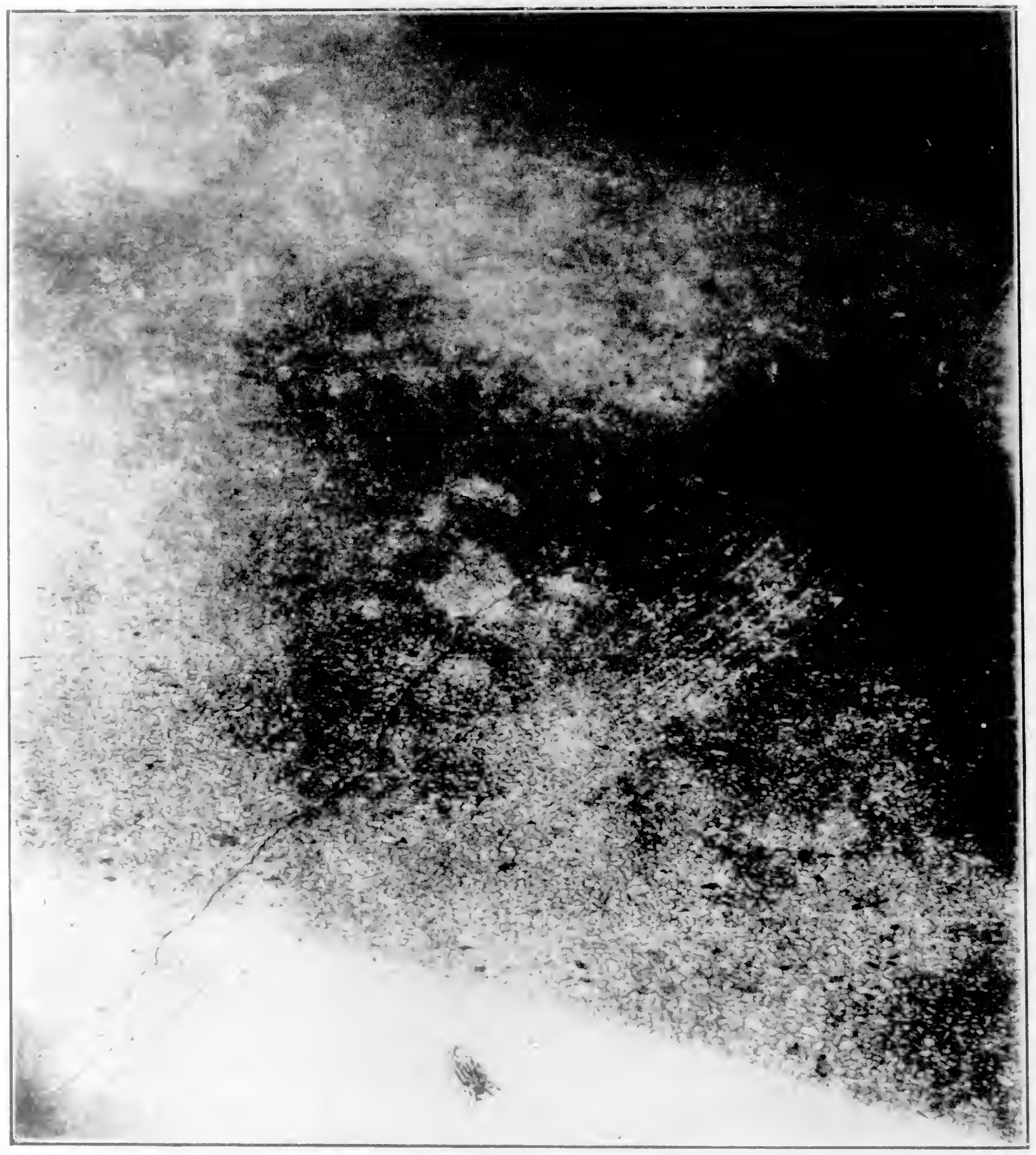

Fig. 1.

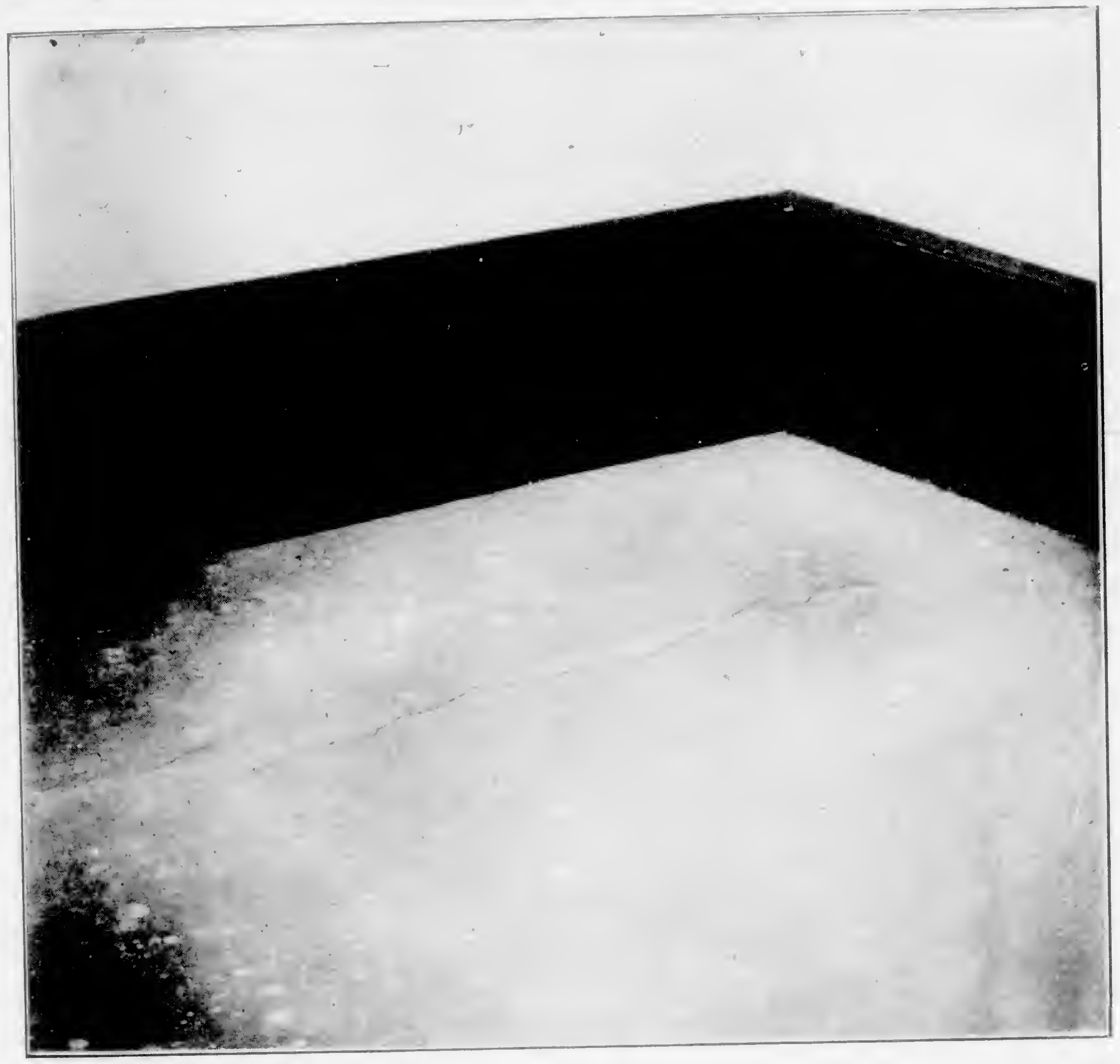

Fig. 2.

The principle of the continuous beam includes the rigidity and relative positions of its supports. However, a small settlement or displacement of the supports occurring in practice, will not cause the assumptions to be materially altered.

The principal feature with which we are concerned, is the determination of the moments which shall be provided for at the center and over the supports. Each slab or beam will then be considered as a separate span and the amount of "fixedness" at the ends determined.

Let "l" be the span in feet.

Let "w" be the uniformly distributed load in pounds per lineal foot.

Let "W" be the central concentrated load in pounds.

Let Mc represent the bending moment at center in foot lbs.

Let Ms represent the bending moment at supports in foot lbs.

For a freely supported beam of uniform cross section:

$$Mc = +\frac{wl^2}{8}$$

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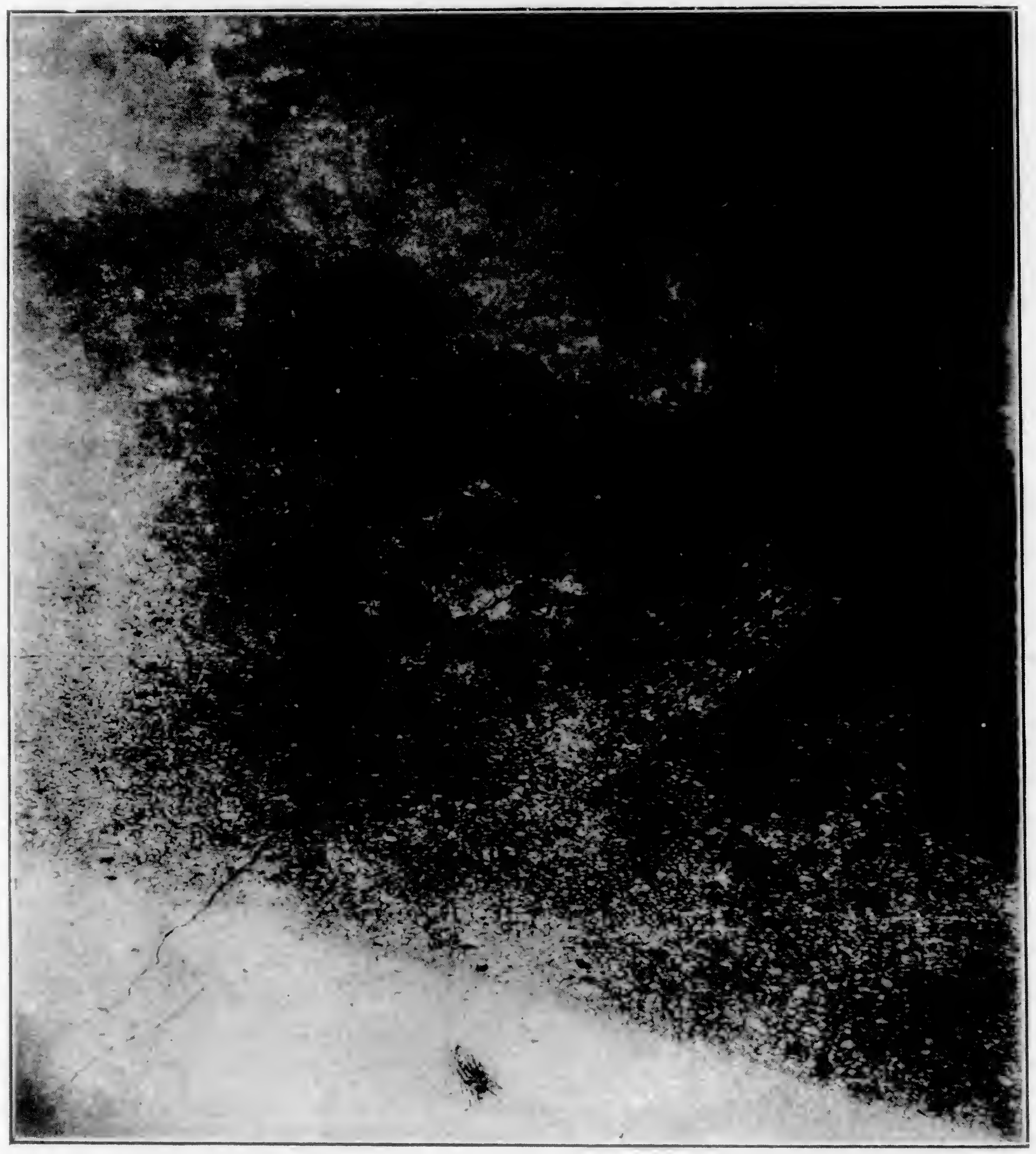

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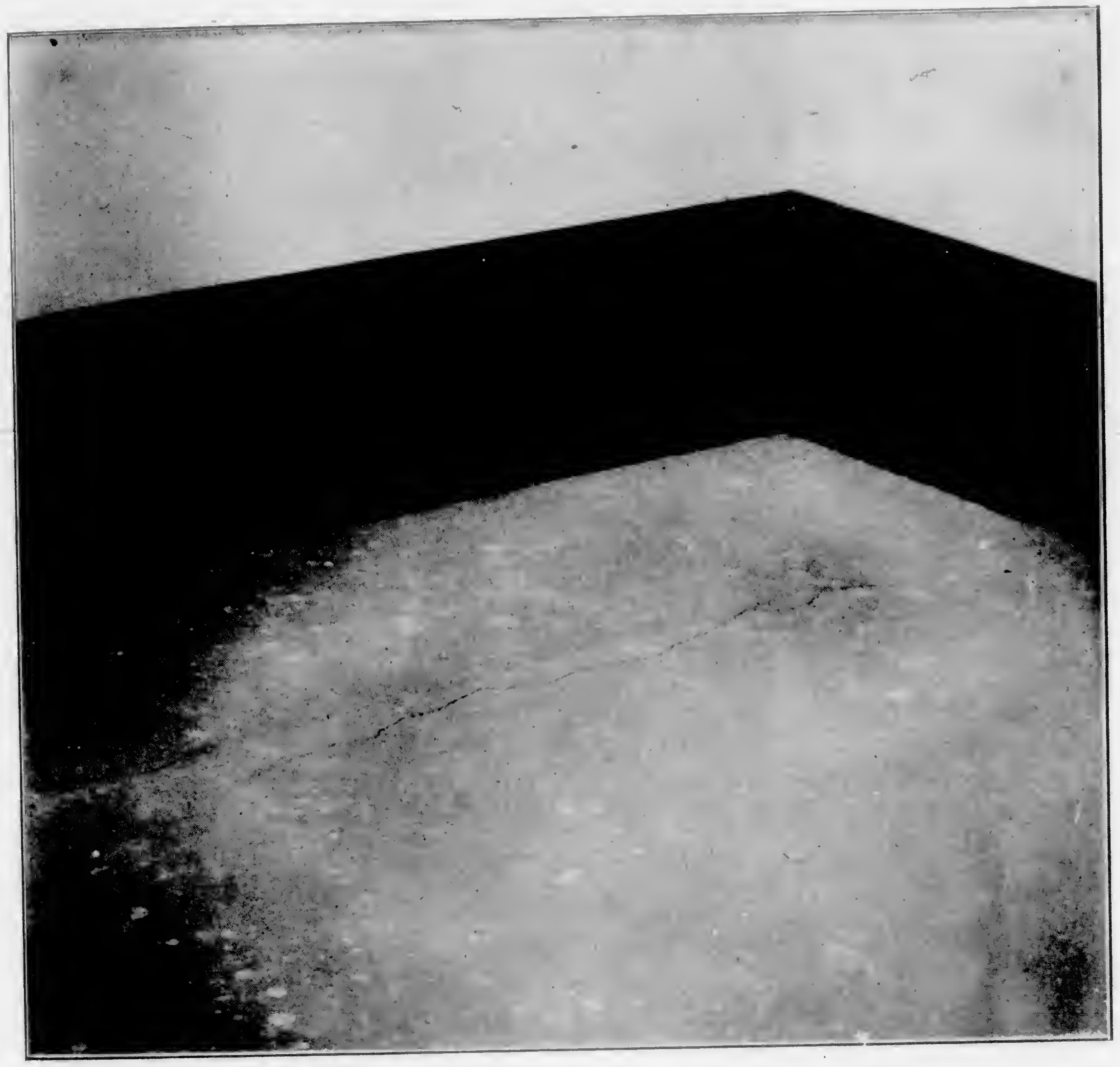

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Let "W" be the central concentrated load in pounds.
Let Mc represent the bending moment at center in foot lbs.
Let Ms represent the bending moment at supports in foot lbs.
For a freely supported beam of uniform cross section:

$$Mc = +\frac{wl^2}{8}$$

For a beam fixed or perfectly built-in at the ends and of uniform cross-section:

$$Mc = +\frac{wl^2}{24} \qquad Ms = -\frac{wl^2}{12}$$

The building-in or fixedness in reinforced concrete not being complete and the beams not of uniform section, the value of Mc and Ms will have some intermediate values between those given above.

Under the condition of a central concentrated load, for a beam completely fixed at the ends and of uniform cross section:

$$Mc = +\frac{Wl}{8} \qquad Ms = -\frac{Wl}{8}$$

Fig. 3.

Most designers assume the maximum bending moment for a uniformly distributed load as $Mc = \frac{wl^2}{10}$. This would consider a negative moment of $\frac{wl^2}{40}$ as existing over the supports. For certain positions of loading of two adjacent spans, complete fixedness will result, and hence $Ms = -\frac{wl^2}{12}$. This should, generally speaking, be the minimum value considered as occurring over the center of the supports. In the case of beams, the columns and haunches provide increased depth and the reinforcement may be diminished to satisfy the decreased moment at the edge of the haunches, which is usually the critical point. In calculating slabs, the increased depth of the beam likewise allows of a reduction of the reverse moment.

It is the practice of some designers to assume $Mc = \frac{wl^2}{12}$ and to proportion the concrete and steel sections accordingly. The contraflexure stresses are safeguarded by providing approximately 4/10 of the sectional area of the lower reinforcement over the supports for interior spans and about 5/10 at the end supports.

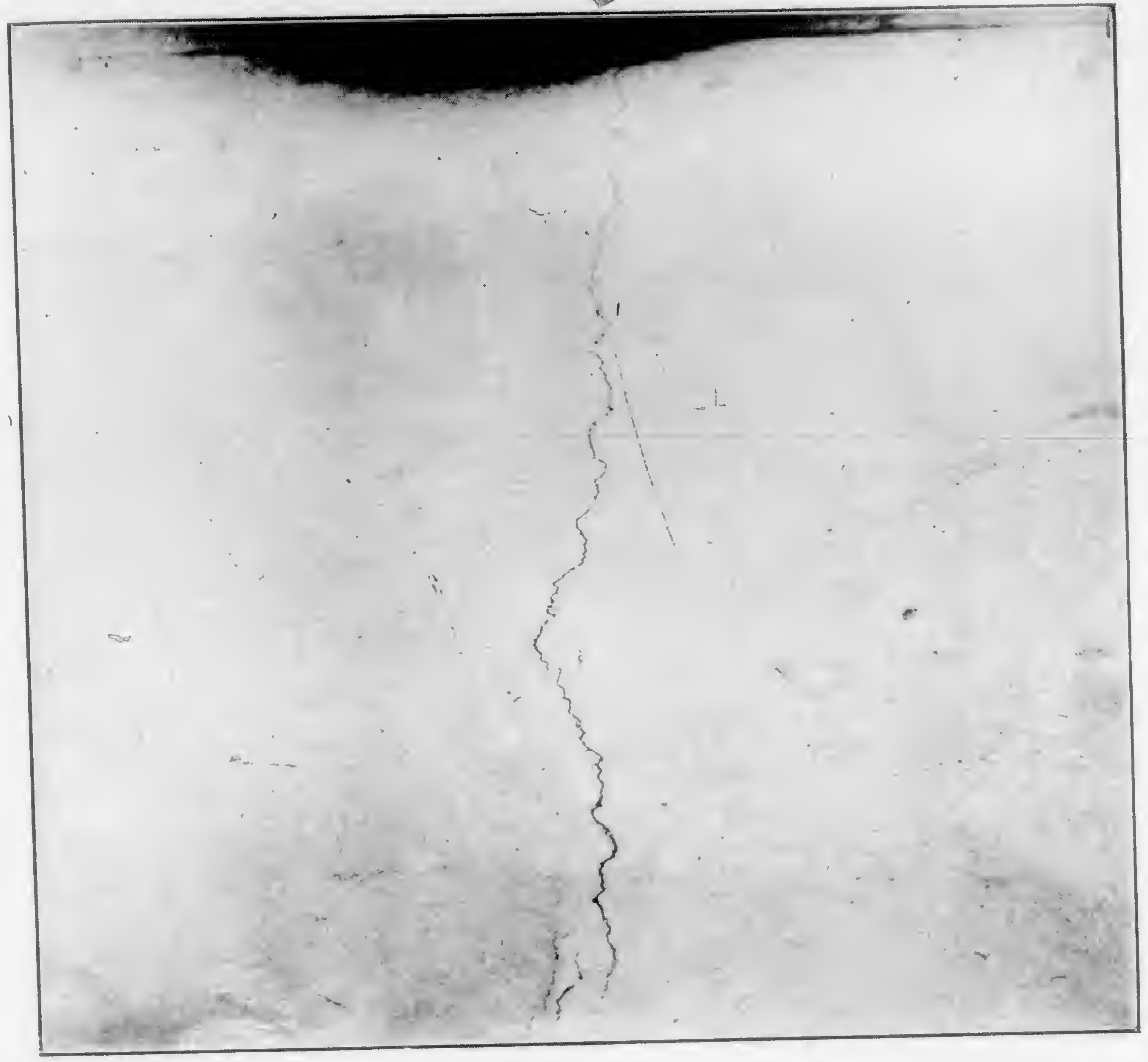


Fig. 4.

By designing a number of beams for the ordinary conditions of spans and loadings, using a concrete stress of 600 lbs. per square inch, and 16,000 lbs. per square inch on the steel, it is found that the continuity reinforcement will have a stress of about 20,000 lbs. per square inch under full continuous action, if 4/10 of the sectional area of the lower reinforcement is continued over the supports. However, the slab bars adjacent to the beam are an asset that further diminishes this stress. Unless the live load is very large in comparison with the dead load, the value of $Ms = -\frac{wl^2}{12}$ provides ample strength for the stresses occurring at the center of the span. Should the simple span condition be brought about, which rarely occurs, the stress in the concrete and steel would be increased about 50 per cent. Under full continuity condition, the points of contraflexure are respectively 0.21 and 0.25 of the span from the supports for a uniform load and a concentrated load. The continuity bars should therefore extend at least ¼ of the clear span from each support, and always be placed in the top of the slab.

The above construction has the added advantage of easy adjustment in the field. Customary practice employs the use of a five-bar beam, three of which may be used to resist horizontal shear. Effective results are obtained by bend-

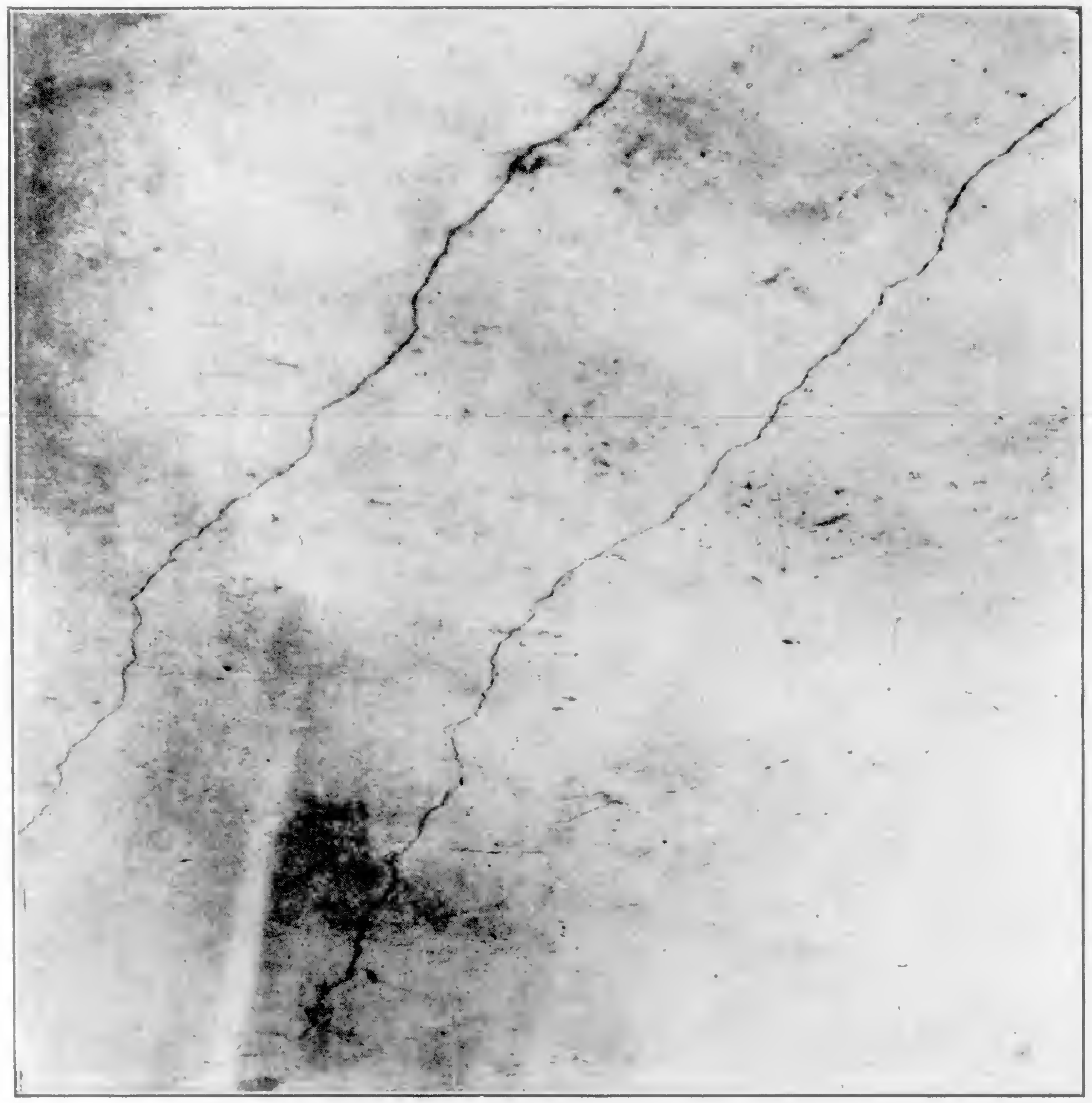


Fig. 5.

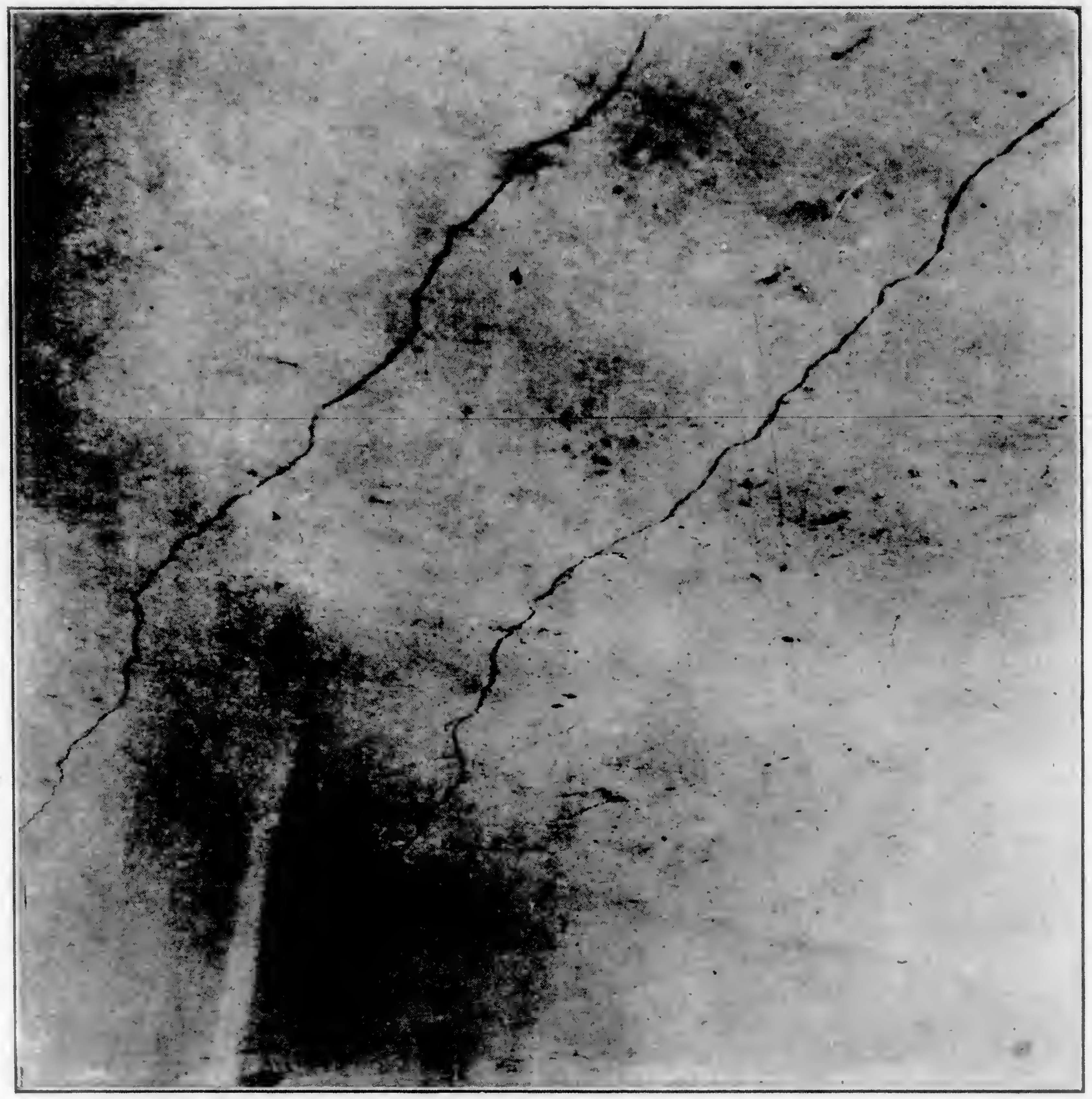
ing up one bar at the quarter point of clear span, two bars at the eighth point, and continuing these latter bars over the supports the proper distance into the adjacent span. This reduces the multiplicity of bars passing through the column to a minimum, besides being economical. Tests have shown that the inclined bars are effective and will in most cases provide ample security against longitudinal shear. In the case of slabs, alternate bars should be bent up at the quarter points and extend over the supports, or should run continuously through the bottom, and have additional bars placed over the points of support for the contraflexure tension. The latter method has the advantage of being cheaper to place in the field and probably insures a more accurate result. It is not sufficient to reinforce the bottom of the slab for a simple span condition alone, unless one be satisfied with the certainty of having floor cracks along many of the lines of support. The mechanical laws of beam action in reinforced concrete are dependent upon the nature of the material, its manner of incorporation, and are inflexible. The above formula show that the zone of tension in the slab or beam changes from the bottom to the top of the member, at a place at or near a point one-quarter of the span from its points of support.

The placing of reinforcing material in a continuous line on the bottom of the slab, should not be confused with continuity reinforcement in the sense herein discussed; neither does the raising of the reinforcement to the top of the slab over the points of support, insure a sound result, for the reason that the tension starts at these quarter points, becomes the maximum at the point of support and may be sufficient at some point between the quarter point and the place where the reinforcement bends up to cause the unsightly crack. These cracks bring the slab into a simple span condition, but they have greatly weakened it through having depreciated its possible shear resistance, and are therefore the measure of the strength of the member.

To show that the above predicted results do occur, the writer has had several views of floor cracks taken within the last few days, which are shown in Figures 1 to 5. These examples have been selected as fair averages, as near as the judgment of the writer would permit, and he is perfectly certain of being able to point out many more cases. The first three were taken in steel frame buildings, having spans (as nearly as could be determined) of 6 to 8 feet, center to center of steel beams. The latter two are concrete buildings in which the slab had a span of approximately 15 feet in each direction without any intermediate beams. A very careful search has failed to reveal any of these cracks in buildings in which the continuity reinforcement was used over the points of support. The shrinkage cracks in the surfacing of concrete floors should not be confused with the structural cracks, and are always easily detected because they seldom, if ever, run parallel with the line of support within the zone of tension.

In conclusion, the writer asserts that there is no excuse whatever for the occurrence of any but surface cracks in reinforced concrete floors, and the precautions necessary to prevent such defects involve but little, if any, extra expense.

A Relic of Early California



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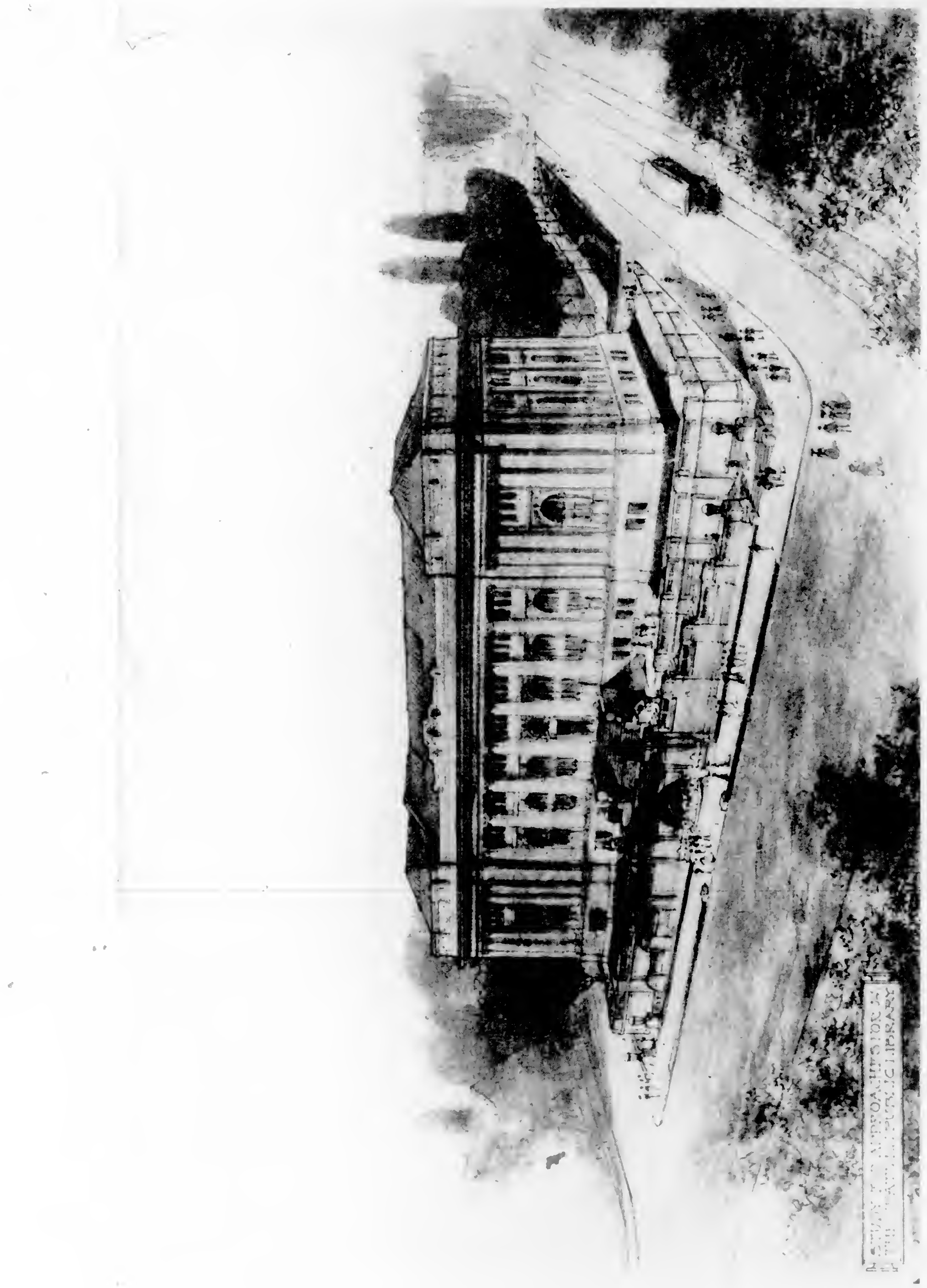

Study for Approaches for Seattle Public Library

Sommerrell & Cote, Architects

Among the Architects

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Athletic Club Building

The building committee of the Los Angeles Athletic Club, composed of Frank A. Garbutt, Wm. M. Garland and Milo M. Potter, has decided on Harrison Albright as the architect for the ten-story club building to be erected on the northeast corner of Seventh and Olive streets.

In the contract made between the parties thereto it was stated that work should begin within thirty days and that the building be completed by January 1, 1909, at a cost not exceeding $650,000.

The new building will be constructed entirely of reinforced concrete and will rest on a reinforced concrete slab, which will cover the entire lot and extend to within two feet of the curb lines of the streets and alley.

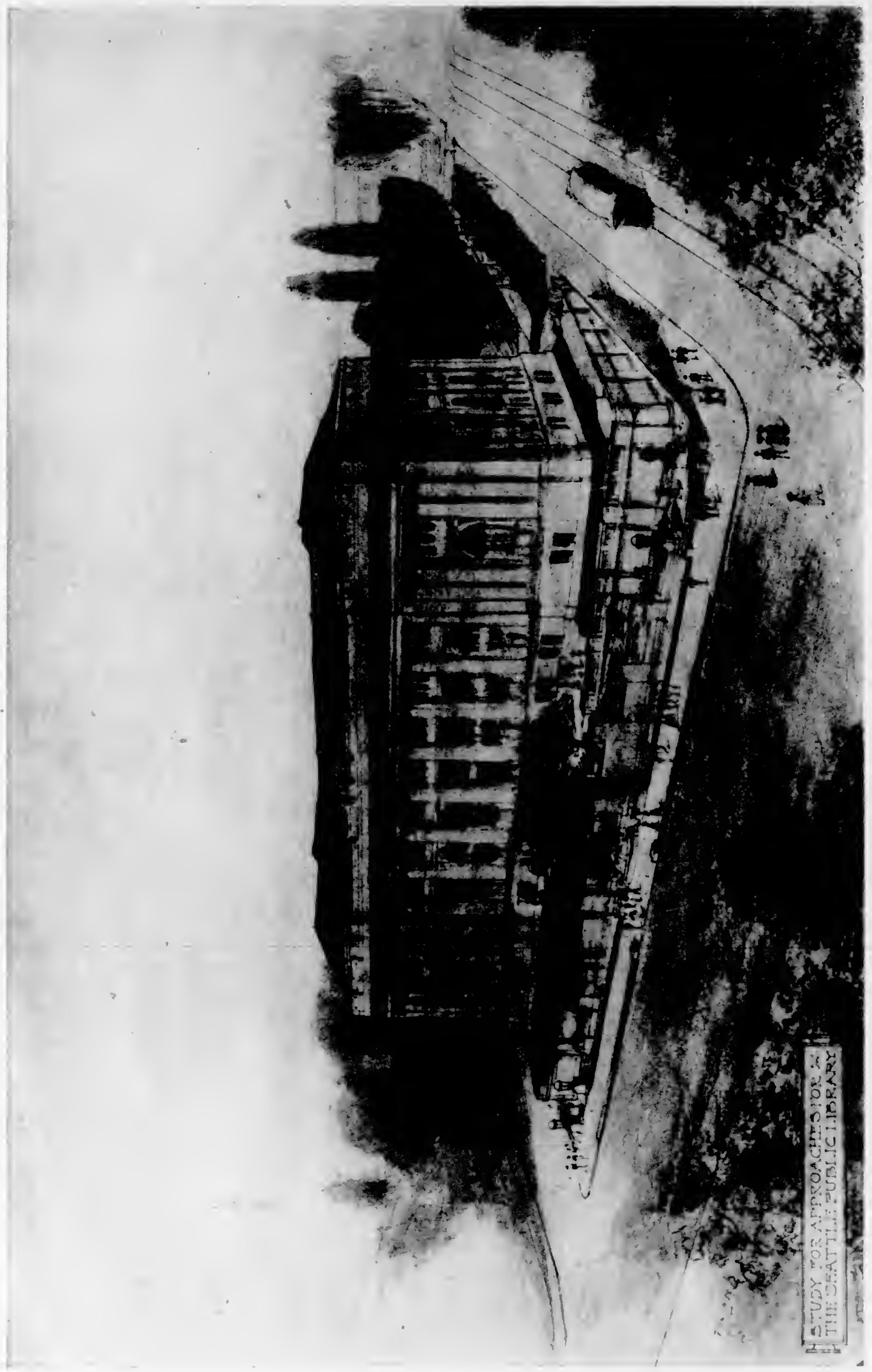
Concrete Building for Santa Rosa

The people of Santa Rosa expect soon to have a new City Hall and Fire Department building to replace the structures destroyed in the earthquake two years ago.

The City Hall, as proposed according to the plans that have been adopted by the Council, will be a handsome two-story structure, built on beautiful lines. It will contain a commodious Council chamber, private offices for the Mayor, offices for all the city officers, the jail, with large steel cells and a meeting place for the general public. The Fire Department building will be directly in the rear of the City Hall. The structures are estimated to cost $60,000, and will be of steel frame with reinforced concrete.

Masonic Temple

Richmond Lodge of Masons will shortly commence the erection of a three-story temple on their lot, 75x100, on the southwest corner of First avenue and Clement street, San Francisco, from plans by Architect Hermann Barth. The ground floor is laid out for stores, while two lodge rooms and six suites of offices will be on the second floor and a banquet and ball room on the third floor. A heating plant will be installed. The investment will represent approximately $60,000. Richmond Lodge is one of the youngest lodges in the State, being less than two years old.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Concrete Building for Santa Rosa

The people of Santa Rosa expect soon to have a new City Hall and Fire Department building to replace the structures destroyed in the earthquake two years ago.

The City Hall, as proposed according to the plans that have been adopted by the Council, will be a handsome two-story structure, built on beautiful lines. It will contain a commodious Council chamber, private offices for the Mayor, offices for all the city officers, the jail, with large steel cells and a meeting place for the general public. The Fire Department building will be directly in the rear of the City Hall. The structures are estimated to cost $60,000, and will be of steel frame with reinforced concrete.

Masonic Temple

Richmond Lodge of Masons will shortly commence the erection of a three-story temple on their lot, 75x100, on the southwest corner of First avenue and Clement street, San Francisco, from plans by Architect Hermann Barth. The ground floor is laid out for stores, while two lodge rooms and six suites of offices will be on the second floor and a banquet and ball room on the third floor. A heating plant will be installed. The investment will represent approximately $60,000. Richmond Lodge is one of the youngest lodges in the State, being less than two years old.

Fine Hotel for Berkeley

Three complete sets of plans for the new Shattuck hotel, to cost $500,000 and to be erected at the corner of Allston way and Shattuck avenue, have been submitted to the directors of the building association in a contest to determine who shall draw the final plans for the structure, according to an announcement by Superior Judge William Waste, a director.

The competition was decided upon by the directors as a means of selecting the most capable architect. He will be given six months or longer to make the plans and will be allowed to travel to secure ideas to be incorporated in the structure.

The corporation has ordered the building to be designed in the form of an L, with the foot facing the north of Allston way and with a hundred foot frontage on Shattuck avenue at the corner. The stem of the building will run north and south and will be situated about 125 feet west of the west line of Shattuck avenue.

The competing architects are Meyers & Ward, Ben G. McDougall and H. S. Mackay.

Architectural Exhibit

An exhibit of architectural drawings and photographs was held recently at the Home Club in East Oakland.

The drawing of the Ferry building arcade by Willis Polk was given the place of honor. This drawing was one of the few rescued from the fire and underwent many vicissitudes, finally emerging in several pieces, which were afterward put together. Another drawing of Polk's that attracted attention was that of the First National Bank, delicately colored in oil.

The exhibit was separated into four divisions—domestic, public and semi-public buildings, sketches and picturesque bits of architecture abroad, and photographs. Among the more noticeable drawings shown were those of the Bank of California by Bliss & Faville, Custom-house by Tharpe & Rixford, the Claremont Hotel by C. W. Dickey, and the Olympic Club interiors by Henry A. Schulze.

May Have State Building

After being held in abeyance for over a year, plans for erecting a State Building in San Francisco are to be expedited. Governor Gillett has declared his intention to urge the construction of the structure at once, for which $500,000 was appropriated at the special session of the Legislature in 1906.

Pacific Union Club Building

The plans of Architect Albert Pissis of a club building have been accepted by the Pacific Union Club of San Francisco in competition with sketches submitted by eight of the most prominent San Francisco architects. Second prize was given to McDonald & Applegarth and third prize to Sutton & Weeks. The estimated cost of the building is $350,000. A feature of Architect Pissis' plans is a great inside court.

The building is to be erected on the site of the famous brown-stone Flood mansion in front of the Fairmont Hotel.

Some of the plans included designs which would make use of the standing walls and of the costly stone, which was brought from New Hampshire, and other designs called for a completely new edifice; but practically all of them followed classic designs.

The completed drawings, each with its designer's name omitted, but with a number, supplemented by a number and the right name in a sealed envelope to be opened after the competition was decided, were submitted to the board on January 15th.

After considerable deliberation the board placed the eight plans on exhibition. The designs included three and four-story buildings. The architects in the competition were Clinton Day, Reed Brothers, Trowbridge & Livingstone, William Curlett, Albert Pissis, Sutton & Weeks, McDonald & Applegarth and Louis P. Hobart.

Cathedral for San Francisco

The suggestive designs and plans for the new Episcopal Cathedral to be erected on the Crocker block at California and Jones streets, San Francisco, are the work of the late G. F. Bodley and C. S. Hall, London architects, who have made a specialty of church design and construction. The plans are tentative, being subject to revision by the committee, and even after acceptance it may be some time before they are carried into execution, as the cost of the building is approximately estimated at $1,000,000.

There are two water color pictures among the plans, one of the exterior the other showing the interior looking toward the altar. At first glance they produce a decidedly pleasing effect, mingled with a sense of bigness of the projected cathedral. The style is fourteenth century Gothic with touches of the decorated, or later period, though in all the graceful lines of the perspective design it is plain that the cenception is distinctively and exquisitely

English, and the treatment in harmony with the churchly feeling of the period to which the style belongs.

The cathedral is designed 275 feet in length externally, and 120 feet 4 inches across nave and aisles, the width of the nave being 37 feet. The transepts are 37 feet wide and 157 feet long internally. The height from floor to apex of ceiling is 85 feet. The central tower is 144 feet to the top of the parapet and 217 feet to the top of the spire. The towers on the California street front are 180 feet to the top. The plan consists of nave and double aisles with chapels. The roofs are to be of wood treated with finely carved beams and boarded inside. The interior is amply lighted with clerestory windows. At the north end, or described in ecclesiastical architecture, the east end, there will be a stone reredos—a delicate tracery effect in stone, such as is seen only in the Gothic cathedrals.

The interior will have the advantage of being seen all at once. The London designers propose three chapels. As described by them, there will be a fine sense of space at the crossing of the nave transepts under the central tower, and at the entrance leading to the chancel there is an oak screen vaulted and surmounted with a carved beam with the crucifixion. The architects also propose the organ divided into two parts connected with electric action.

The photograph of the exterior perspective shows California street looking west from Taylor street. The California-street front is characterized by two spires, massive in the tower parts and terminating in characteristically graceful finials. There is no door on that end, the main entrances being on the sides, approached by long flights of steps, and the transepts have large entrance doors. Ample spaces are reserved for vestries, the sacristy and the baptistry.

The New Hearst Building

The plans for the new Hearst building, to be erected on the corner of Market and Third streets, San Francisco, call for a building much larger than the old one. The main portion of the building will be eighteen full stories above the ground, and twenty-two floors, exclusive of landings in the lantern above the tower. The annex portion of the building will front on Stevenson street, 40 by 64 feet, and will be eight stories. The architects are Messrs. Kirby, Petit & Green, who have established a branch office in San Francisco.

The foundations are to be 32 feet below the curb level. In the selection of the architectural treatment of the exterior the architects have perpetuated the traditions and the character of the early Spanish settlers, who have created what we recognize as the Mission style. The first and second stories will be faced with pink Tennessee marble, while white glazed terra cotta will be used up to the sixteenth floor, above this the terra cotta will be polychromatic. The roof is to be covered with huge copper tiles. The floors will be fireproof with reinforced concrete, and partitions of steel studs, wire lathed and plastered.

More Fine Office Buildings

The newest notable additions to the commercial architecture of San Francisco are the Bartlett Doe Estate building, which will rise beside the Sherman-Clay building and also have a frontage on Sutter street, and the Maskey building, which will soon be erected a few feet north of the Chronicle building. A third monumental structure, on the site of the Thurlow block, and a tall building for the Adams lot at the northeast corner of Sutter and Kearny streets, will, when completed, make Kearny street one of the notable streets of the world's cities.

Plans have been finished for the Doe and the Frank Maskey buildings by Havens & Toepke. The Doe building will be ten stories in height, though but six will be built at present. It will have a frontage of 85 feet on Kearny street and 41 feet on Sutter street. The estimated cost is $295,000. Maskey's building will be six stories high and will cost about $130.000. Both structures are designed for offices and stores, and their fronts will be of light cream glazed terra cotta. They will have steel frames, the Doe building to be of the Class A type, and the other Class C—an improved combination of steel frame and wood.

Architects Offer Prize Competition

The Washington State Chapter of the American Institute of Architects has decided to offer a competition to the draughtsmen of the State, under 30 years of age, the subject to be the designing of a country inn, to be built in the Coast country, and suitable for Coast climatic conditions.

Six weeks will be allowed for the preparation of the drawings and full information as to the terms of the competition can be had from David J. Meyers, Lowman building, Seattle. Two prizes, one of $50 and the second of $35 will be offered. The drawings are to be simply rendered and the members of the chapter hope that all the draughtsmen in the State eligible for the prizes will compete.

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A correspondent writes:

"San Francisco wants the 1909 convention of the American Institute of Architects."

The Pacific Coast is entitled to entertain this distinguished body some time, but probably not so soon as 1909. We would like the opinions of members of the Chapter.

ARCHITECTS AND THE DAILY PRESS

Our sentiments, briefly outlined in these columns two months ago anent architects and the daily press, are echoed in the following editorial in the Inland Architect and News Letter for January:

"One of the greatest aids to an appreciation of architecture by the public is the support of the daily press. That this support is woefully lacking in many cities is apparent to all. The instances are numerous where scant notice is taken of architects and their work, notwithstanding that a city is praised or condemned chiefly for the character of its buildings. It is of importance to architects to ascertain the reasons of each newspaper in their city for the apathy shown, and systematically strive to overcome this, and secure more interest in current architectural work. The attitude of the newspapers with relation to the last convention of the Institute was a conspicuous example of how little support is given the profession of architecture by the daily press. This was not due to lack of effort by the press committee of the local chapter, who left nothing undone to secure publicity for the event. The principal reason was, doubtless, that the subject of architecture did not appeal as strongly to the editors in charge as other subjects that at the time were pressing for recognition. The systematic campaign for public recognition of architecture may well begin with the editor-in-chief of the great dailies, and follow down to the reporter who makes the round of the architects' offices for news. Courteous and considerate treatment of the reporter is not the least effective way to obtain the desired end."

MONEY DEPRESSION RESULT IN CHEAPER BUILDING

In an interview just given by Architect Fitzpatrick of Washington, the executive officer of the Building Inspectors' Society, an organization that keeps in closest touch with building matters all over the country, that authority asserts that the present is a most opportune time for people to build. The money stringency has developed some peculiar effects upon the building situation. Just prior to the so-called panic everything was at the highest, not only materials but labor. Wages were at the highest point ever reached and the amount of work done in a day was the lowest ever given. Labor was exceedingly independent and the result was that buildings cost anywhere from 20 to 60 per cent more than they did a very few years ago. Tightening of money has scared people generally; manufacturers are anxious to get rid of their stock and get some money in and are making low prices on materials, and while wages have not been reduced to any great extent men are desirous of "holding their jobs" and are rendering immeasurably better service. It is only a question of a little time when conditions will have eased up and labor and materials will be at the same old high-priced standard.

Unmistakably the people have had a stiff enough dose of stock depreciation and have seen the folly of trying to make big returns by stock gambling. More and more will it be brought home to them that real estate and building constitute infinitely safer investments and it will not be long before we will have boom times again in building. The men who are far-sighted enough and have acquired wisdom are the ones who will close up contracts and "cinch" their building operations and get started at once. Those who want to wait and see, and postpone building contemplated structures for a year or so will pay the penalty in a greatly increased, enforced expenditure.

To build now would be wise and to build well at all times is wiser still. The safest and most reasonable investment in building is a structure that cannot be destroyed or even damaged materially by fire, a thoroughly fireproof building. And a thoroughly fireproof building is one whose frame is of steel, whose outer walls are of brick and terra-cotta, whose floors and partitions are of brick or hollow tile or concrete protected with tile, whose several stories are separated and constitute distinct units, whose windows, protected against external attack, keep fire out, and whose entire construction is thoroughly and sensibly executed. To all sensible investors I should say "build now and build well."

What His Music Bill Meant

An architect who had planned and superintended the building of a west side residence had turned over the completed house to its owner. The architect has been in nowise hampered in the expenditure of money, yet his customer, being a good business man, gave his personal attention to the details of the cost.

"What does this mean?" he asked on a final inspection of the bills. "Three hundred dollars to a quartet of trained musicians. How can anybody have given a concert already in my house when no one is living there?"

"They were testing the acoustics of the rooms," the architect explained. "Every room in your house has been submitted to that test. There will be plenty of music there later on, and I certainly wouldn't want to finish the house without being sure that the sounding properties were satisfactory. In these days every private house or hotel that amounts to anything is put through the acoustic test before it leaves the architect's hands."—New York Sun.

Lighting and Heating of Buildings

covering

Wiring and Piping; Electric and Gas Fixtures; Telephones and Bells; Electric Elevators, Dumb Waiters and Hoists; Electric Signs, Burglar Alarms; Electric and Gas Heating and Cooking Devices; Electric Motors; Gas Engines, and Individual Power Plants for Lighting, Pumping, Refrigerating, Etc.

Design of Conduit Systems for Office Buildings

By PAUL C. BUTTE

THE design of a conduit system requires careful consideration owing to the varying conditions that are usually met with. And the first design should be made with a view toward future changes and extensions as much as possible, as in most cases a radical change is comparatively very expensive and very difficult to make.

Current is to be conveyed to light outlets on the different floors of a building for giving a certain illuminating intensity, which is shown by the architect's plan, and it is the duty of the engineer to lay out the wiring system as efficiently as possible, at the same time bearing in mind economy, so as to avoid a useless expenditure of money for superfluous materials and labor.

The principal questions to be considered are: What is the cost of copper and conduit? What is the cost of labor? The labor question is by far the most important one, because it would be easy to show by comparing the cost of material used in the construction of mains, feeders and branches with the cost of labor in installing them, that labor is of first importance, as $100 worth of material may cost anywhere from $50 to $200 or more to install. It would be difficult indeed to give iron-clad rules for determining these relationships but perhaps the best that can be done is to follow the common-sense rule of laying out the work so that the labor bill is low.

Where it is possible to have greater drop and consequently a lighter wire and in some cases less labor in handling it, the choice becomes self-evident. When the cost of labor is equal in both cases, under consideration, saving can only be attempted with the copper, and the reverse, namely when the cost of copper is equal, in both cases, saving must be attempted in the labor.

Perhaps, this idea can be best illustrated by a practical case. Suppose 500 amperes is to be supplied to a set of feeders, will it be necessary to use one or two sets of mains? If the wires are to be run in conduit for a distance of 100 feet, a calculation will show that at a drop of 1 per cent at 110 volts, 1,000,000 C. M. cables will be required. If the wires are run straight ahead, there is a possibility of using such a heavy wire, but where there are bends, it is much more advisable to run two sets of 500,000 C. M. wires in multiple. This is true where conduit is used, although many might raise objections to this conclusion on the grounds that it costs less to run a single line of 1,000,000 C. M. cable than two sets of 500,000 C. M. cables. This matter can only be decided by experience; and even then a decision would rest largely upon the character of labor employed, which naturally involves questions of strength, skill, and speed in the performance of the same. If a single line of 1,000,000 C. M. cables is installed there is a saving in cost of material and labor, provided it takes less time to run the wires. Where elbows are to be encountered, an extra flexible cable might be employed and labor saved, but the wire costs more, so the point to be considered of cost of wire or material and cost of labor, is in a practical sense a part of the triple question involved under the head of drop, material, and labor.

The arbitrary choice of 1 per cent for the drop in the mains above referred to might have been made 2 per cent, in which case the size of the wire being one-half or 500,000 circular mils, the doubt disappears; but if the maximum drop to the farthest outlet is 3 per cent, only 1 per cent drop is left to be distributed between the feeders and branches and if putting more copper here, means more labor distributed among a large number of wires, than putting it on the mains, it is obviously a mistake to increase the drop on the mains. The determination of the most economical arrangement is best arrived at by tabulating the different elements of wiring system, when the proper results can be obtained with little difficulty. There is no hard and fast rule to determine the proper distribution of the losses as each case brings up different conditions that must be taken into consideration.

It is a well-known fact that the incandescent lamp is very seriously affected by a slight variation above or below the normal rated voltage of the lamp. This is shown by the following results of a test made by the writer:

Voltage.		Av. Hor. C. P.	Av. Life of Lamps.
115.5		21	623 hours
110	normal rating	16	1008 "
104.5		11.8	1432 "

The necessity of maintaining as uniform a voltage as possible is evident from the above test. One of the important problems in laying out an extensive system is the proper distribution of the copper so as to avoid a great variation of drop in voltage between any two outlets. This is accomplished by the proper selection of centers of distribution. A wiring system is in many respects like a nervous system in its branches and ramifications, but the most interesting fact is the similarity between the ganglions in the nervous system and the centers of distribution of the wiring system. From these points, not only does the current become distributed, but the pressure is delivered as nearly uniform as possible to the various lamps or outlets at which it is utilized. In placing the distributing centers on a floor of a building it is necessary to so arrange the wires that the drop on each circuit will not exceed a certain amount and each branch circuit should be calculated separately. It is obviously more economical to have two or three centers of distribution on a floor than a single one where the system is complex, or where a considerable area is covered, as this shortens up the average length of the branch circuit and allows a smaller wire for the same drop in voltage.

A number of arrangements have been devised for attaining uniformity of voltage in the risers of tall office buildings without causing an excessive investment in copper, and they are all based on the principle of using centers of distribution and sub-feeders. These arrangements, of course, depend upon the dimensions of the building, and the character of the load to be carried.

After the sizes and number of main, feeder and branch circuit wires have been determined, the conduits necessary for protecting the same should be calculated. The installation of a conduit system is practically equivalent to the equipment of a house with pipes, exposed or concealed, as the case may be, through which wires are fished after the pipe work is completed. The necessity for using conduit of the correct size need hardly be commented upon. The greatest difficulty will be experienced if the pipes catch or grip the wires when they are fished through, and it is imperative, therefore, to only use the correct diameters, leaving nothing to chance in

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this respect. It occasionally happens in tall buildings that when mains or feeders are pulled through a conduit having several bends, enormous force is necessary. This may be due to a kink in the wire or the bends or elbows in the pipe. A wire may slip through a pipe easily, yet catch if an elbow or two present themselves. A liberal allowance in pipe diameter will obviate this and save time and necessarily labor and expense if considered in advance in laying out the wiring plans, besides, insuring proper insulation throughout.

Too much stress cannot be laid upon the necessity for as perfect mechanical work as can be done. The details of soldering and connecting wires, the taping of wire and the proper method of installing conduits—all of these belong to the field of purely practical work calling for experience and skill on the part of the workman. Efficiency can only be secured if every portion of the conduit and conductor undergoes a careful inspection during the development of the work and during its completion. By a consideration of the above points the ultimate success of a conduit system is assured.

Cords and Chains for Electric Light Fixtures

IT HAS frequently been said by those interested in electric lighting that electric fixture designs have followed too closely the lines of gas fixtures. There is undoubtedly much truth in this assertion. Because a gas fixture needs a pipe to convey gas to its burners is no reason why the electric man should persistently use a rigid pipe for his fixtures also. In the abolishment of the conventional gas fixture idea, electric fixture designers will have the hearty support of architects, who are apt to consider the lighting fixture as somewhat of a nuisance. To these, electric lighting should appeal particularly for the reason that it offers the opportunity of doing away with fixtures altogether by placing lamps in recesses with suitable reflectors behind them or the use of unobtrusive hemispheres. This applies mainly, however, to the more expensive work. For cheap, every-day installations, more extensive use of cords and chains can be made with advantage than has been common practice in the past. Unfortunately, the plain drop cord has received the stamp of cheapness and inelegance, largely because of the cheap, quickly fading cord that has commonly been used and the way it has been used. Certainly, some of the round silk-covered cord now easily obtainable in the open market is no more unsightly than the brass rods which it might in many cases supplant. There is no reason why it should not be more generally used to support light lamp fixtures of most artistic design. For heavier fixtures which it is not permissible to hang from cords, the chain pendant offers a cheap, artistic and substantial solution.

Both the chain pendant and drop cord offer a better mechanical construction in many places than a fixture with a rigid stem. Very few fixtures remain in use many years without becoming more or less loose at the ceiling. They are exceedingly likely to get out of plumb, and are frequently pulled one way or the other by having extension plugs and cords attached to them. The flexible suspension, which keeps itself in plumb and yields to accidental blows instead of breaking, is much more desirable than a rigid stem. At the present time, it is by no means necessary, for artistic reasons, for a prospective electric light customer to spend an enormous amount of money in fixtures. In fact, it is possible to do a large amount of high-grade work with a very small fixture bill. The old idea of fixtures with a large number of arms, each carrying a small lamp, is rapidly disappearing, except for the comparatively few locations where the decorative effect of a large number of small lamps is wanted. A fixture with several arms also finds a very useful place in rooms where the difference of requirements at different times makes several sockets necessary. But for most purposes of general illumination, the simple fixtures with a few lamps, or with possibly but one, and of high candle-power is taking the place of the fixture with the centipedal effect and here is where the cord and chain are suitable.—Electrical World.

"Dad, Here's to You!"

We happened in a home the other night, and over the parlor door saw the legend worked in red, "What is home without a Mother?" Across the room was another brief "God bless our Home." Now what's the matter with "God bless our Dad?" He gets up early, lights the fire, boils an egg and wipes off the dew of dawn with his boots while many a Mother is sleeping. He makes

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the weekly hand-out for the butcher, the grocer, the milk-man and baker, and his little pile is badly worn before he has been home an hour. If there is a noise in the night, Dad is kicked in the back and made to go down stairs to find the burglar and kill him. Mother darns the socks, but Dad bought the socks in the first place, and the needles and the yarn afterwards. Mother does up the fruit; well, Dad bought it all, and jars and sugar cost like mischief. Dad buys the chickens for the Sunday dinner, carves them himself and draws the neck from the ruins after everyone else is served. "What is home without a Mother?" Yes, that is all right; but "What is home without a Father?" Ten chances to one it's a boarding house, Father is under the slab and the landlady is the widow. Dad, here's to you—you've got your faults—you may have lots of 'em—but you're all right, and we will miss you when you're gone.

The above was sent out by the Bostwick Steel Lath Company of Niles, Ohio, in the shape of New Year's Greetings.

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Heating a Modern Apartment Building

THIS subject, says the American Carpenter and Builder, is one that every person proposing to erect an apartment building as a paying investment should consider with vital importance. It is an established fact, by practice and theory, that a one-pipe steam system with circuit mains and gravity return is more generally adapted to heat the class of buildings named.

When estimating the radiation, the use of each room should be taken into consideration, also the number of times the air changes, and vary the above factors used so the required temperature can be obtained from the amount of radiation figured. When selecting a steam boiler, the following very important points should be considered. A cast iron sectional boiler is more preferable and economical than a steam boiler, as can be readily understood, in casting these sections, the most important parts can be molded and obtain the proper shapes, such as a large steam space and a well designed flue travel, with the proper proportion of heating surfaces, which is impossible with a steel boiler. The heating surfaces in a heating boiler are those surfaces which have water on one side, and hot gases on the other, and transmitting as much of the heat generated by the fuel to the water as possible, thereby generating steam more easily. By having a boiler with a large steam storage space, a continuous and steady pressure can be maintained all night under banked fires.

A steel boiler will rust out in ten years at the most, and may also blow up, which explosion would destroy the entire boiler, while the average life of the cast-iron boiler is from twenty-five to thirty-five years, and in case of an explosion, there could be no more than one or two sections broken. These could be replaced at a small expense, and by so doing the boiler would be practically new. In figuring the capacity of the steam boiler, 15 per cent of the actual radiation should be added for the heat transmitted through mains, and an additional 15 per cent for the factor of safety. When receiving bids or proposals on a heating system, the most advisable and satisfactory way to receive them would be in the form of a complete specification covering boiler, tools, forendation, flue, smoke pipe, asbestos covering, system of piping, mains and returns, radiator valves and union and radiation.

Continental Fireproofing Company

The Continental Fireproofing Company, with offices in the Mutual Bank building, has recently finished a nice job of fireproofing in the Hyman building on Third street, between Market and Mission streets, San Francisco. This building was designed by Architects Meyers & Ward. The company has other equally important work under way and several good contracts about to be closed. The Continental came to the Coast soon after the big fire and its work and manner of doing business has made for its management many warm friends.

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169 ERIE STREET
SAN FRANCISCO, CAL.

Electric Heating in Shanghai

It is stated by United States Consul W. T. Gracey, of Tsingtan, China, that electric kettles for afternoon tea are finding a sale in Shanghai; also electric radiators in plain or ornamental styles, which are most useful in Shanghai during the damp weather, when a small and steady fire is needed for drying clothing, etc. The Shanghai municipal electrical department has a special low rate of charge for these heating appliances, and they are now being used in residences and offices to good effect.

Granite Monolithic Columns.

Much interest is being taken by engineers and contractors in the erection of the First Federal Trust Company building at Post and Montgomery streets, San Francisco, particularly in the setting of the cored, monolithic column, the first ever placed in position in this country it is said. The weight of a monolithic column is not remarkable, as many heavier ones have been placed in position, but the fact that there is a large core through the center of it renders it very fragile, and the great weight had to be handled with the utmost care.

Willis Polk, the architect in charge of the building for D. H. Burnham & Co., regards it as a personal triumph that he was able to induce the building committee to decide upon a cored monolith in place of a column built up in sections. Nearly every contractor reported against it, as the plan broke all established precedents. Some of the contractors who were asked to bid on the work demanded as much as $9000 bonus as an insurance against accident in handling the monoliths.

A contractor finally agreed to take the work and assume the risk without a bonus. D. H. Burnham insisted that the grain of the monoliths should be the same when standing in the building as in the natural state. In other words it was made a condition that the columns should be cut from vertical sections in the quarry and not from horizontal sections. There are said to be few granite quarries in the world outside of California where a bed of sufficient thickness could be found to permit of cutting the twenty-one foot columns from vertical sections.

There are four columns in all and they were cut out in two sections, two columns to the section. Before cutting and coring the columns, they weighed forty-six tons and afterward twelve tons, which shows the amount of work done upon them. It was necessary to bore more than 300 linear feet of holes in each column in order to take out the cores. This work had to be done with great accuracy, as it was essential that the monoliths should retain a perfectly vertical position after they had been fitted closely over the steel columns.

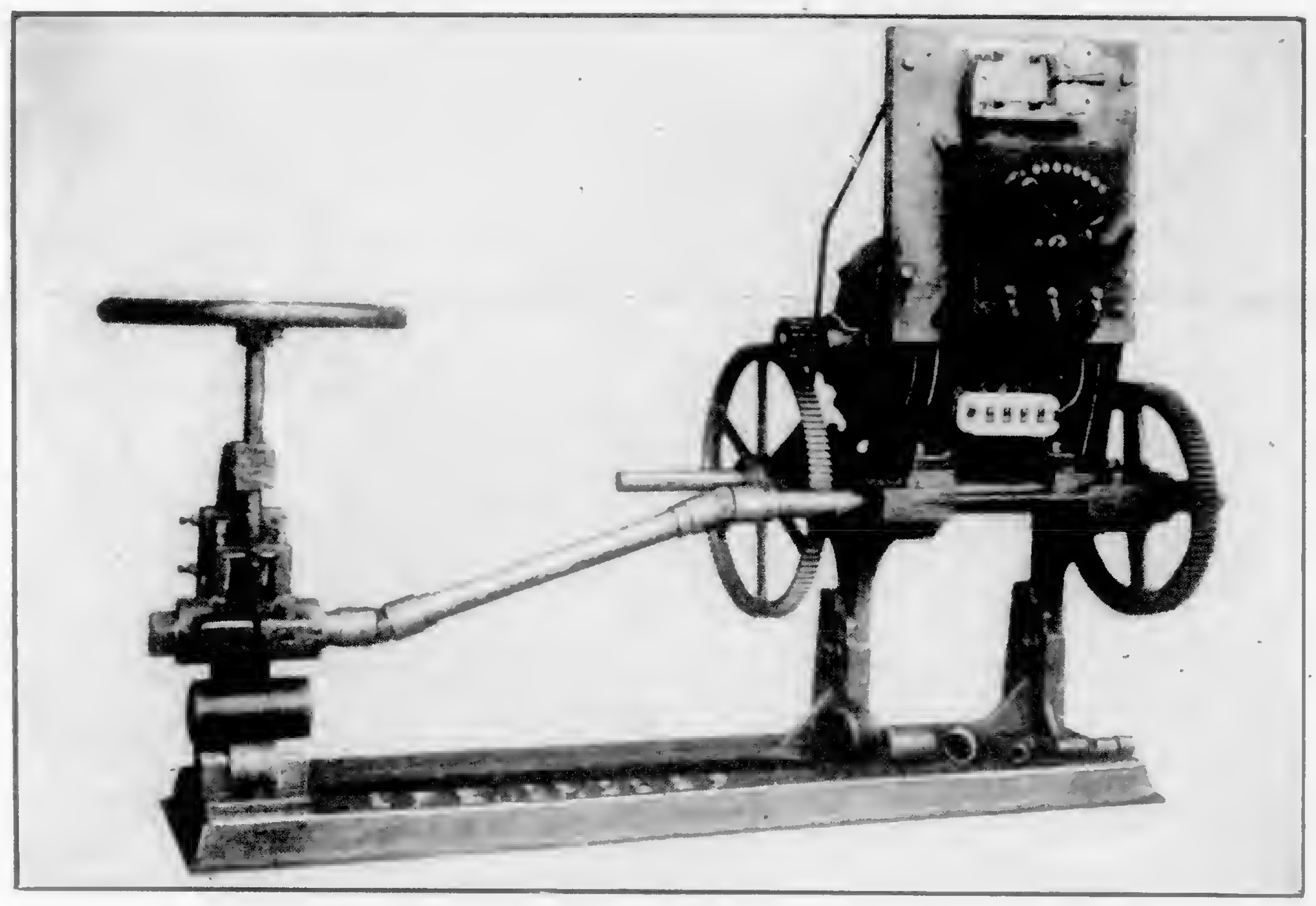
The columns were moved from Raymond to San Francisco on a special train and the crew had received instructions from the officials of the Southern Pacific Company to proceed slowly and with great care in starting and stopping the train.

Many larger granite columns have been placed over steel columns in New York and other cities, but they have not been monolithic. They have been sawed on a vertical cross-section and cemented with marble workers' wax after being placed in position. The piece of work just done is an innovation in stone construction, but the architects believe that the plan will find many imitators now that a successful start has been made.

A House Without a Chimney

Mr. F. M. Sinsabaugh, secretary and manager of the Carrollton Heat, Light and Power Company, of Carrollton, Ill., has just moved into a new house, which is entirely without a chimney or provision for any kind of fire in the house. Mr. Sinsabaugh is getting heat for warming the house from the company's steam-heating system. Cooking is all done by electricity.

MOTOR DRIVEN PIPE CUTTING OFF MACHINE
Cuts from ¼ inch to 4 inch and does the work of 20 Hand Cutters



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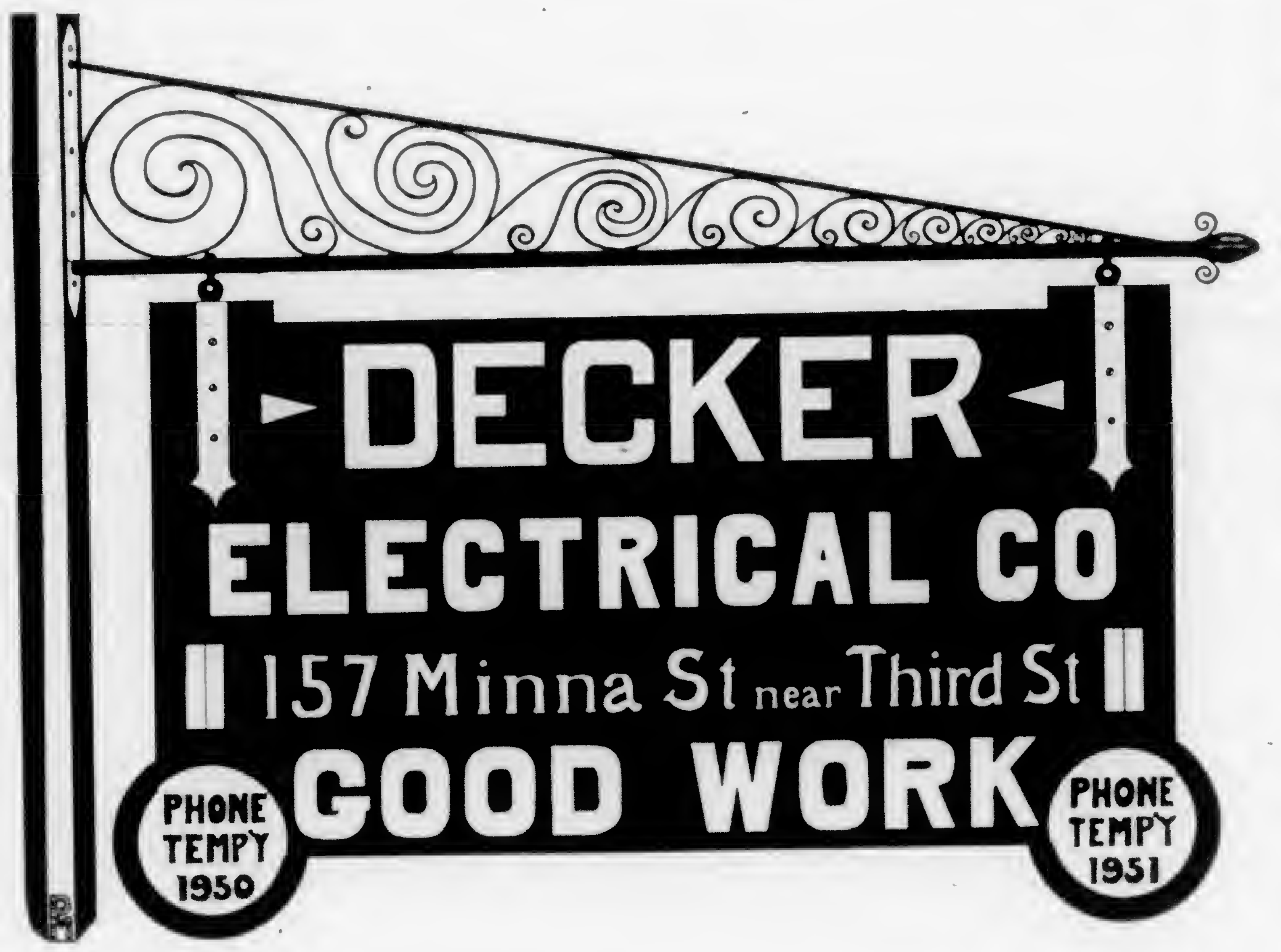

By the Way

Some Industrial Information Worth the While

Fireproof Door Business is Good

Fred Nichols, manufacturer of fireproof metal covered doors, sash, window frames and interior metal finish for office buildings is installing a handsome set of entrance doors in the Farmers and Merchants Bank at Healdsburg, Cal. The doors are finished in statuary bronze. Mr. Nichols is also making the fireproof doors for the Mission Bank of San Francisco, situated at Sixteenth street and Julian avenue. He has just completed and delivered to the Franklin School of Oakland fourteen handsome copper entrance doors, also Kalomeine Iron swinging sash for the St. Clair building, cor. California and Drum streets, San Francisco, Nathaniel Blaisdell, architect; pivoted sash for the Luning building, San Francisco; fifteen sets of sliding elevator doors for the Wilson Estate building on Market street near the Hale building, San Francisco, and sixteen sets of sliding elevator doors for the Burbank Hotel, corner Stockton and Post streets, San Francisco.

Mr. Nichols has other large contracts which he will start on as soon as the money market loosens up. The prospects for the coming spring and summer, he says, are very bright, owing to the large quantities of Kalomeine iron and copper in stock and improved machinery for the manufacture of doors. He is prepared to take anything in the line of Kalomeine Iron interior finish work at comparatively low prices.

Russell & Erwin Goods in Demand

W. R. Voorhees, manager for the Pacific Coast of the Russell & Erwin manufacturing company of New Britain, Conn., has recently returned from an extended trip East. Mrs. Voorhees accompanied him and they visited nearly every important point east of Chicago. Mr. Voorhees says there is plenty of money now in the East, although there is a general tendency to be cautious. He thinks San Francisco will run way ahead of other big cities this year in respect to new construction work. It is one of the very few cities that are not already overbuilt.

The Russell & Erwin Company, through Mr. Voorhees, has just taken the contract for equipping the new Bank of San Jose with builders' hardware. The company also supplied the door fixtures in the recently completed Garden City bank building in the same town.

Dissolution of Partnership

The firm heretofore existing under the name and style the John C. Ince Construction Company, doing business in the City and County of San Francisco, State of California has been dissolved by mutual consent, Mr. John C. Ince having assumed full control. Mr. Ince is well known as a contractor of ability and in taking over the business of the concern which carries his name he has the well wishes of his wide circle of friends and clients.

WEST COAST MAHOGANY
JENISERO—SPANISH CEDAR
HAVE PROVED SUPERIOR TO OTHERS AND ARE MANUFACTURED HERE
WHY NOT SPECIFY AND USE THEM?
DIECKMANN HARDWOOD COMPANY
OFFICE, MERCHANTS' EXCHANGE   MILL AND YARD, BEACH AND TAYLOR STS.
SAN FRANCISCO, CAL.

Praise for Hydrex Waterproofing Felt

The following letter is self explanatory. The Pacific Coast Agents of The Hydrex Felt being the Boyle-Luey Co., Monadnock building, San Francisco.

Madison, Wis., Dec. 24, 1907.

Hydrex Felt & Engineering Co.,
120 Liberty St., New York.

Gentlemen:—The samples of Hydrex Waterproofing Felt which you forwarded to the University of Wisconsin have been tested and also samples obtained from the Wisconsin Capitol foundation work.

We cannot speak too highly of your product. After testing all kinds of waterproofing materials, paints, fillers, compounds, felts, and fabrics, we found yours to be the only one that we could not force water through. A direct pressure of 70 pounds per square inch was maintained on a 1-3-6 specimen of concrete treated with two layers of Hydrex Felt and compound for 110 hours without forcing any water through.

Specimens were made 11 inches by 11 inches, with an exposed surface of 28 square inches. The felt was applied as in practice.

Four specimens were prepared with Hydrex Felt, two with three ply and two with two ply, all of which gave the same results. The curves inclosed illustrate the flow through plain concrete and the absence of flow through the treated specimens.

If there is any additional information about the tests that you would like we would be glad to furnish it to you.

We wish to thank you for furnishing specimens. Very truly yours, (signed) H. E. Ketchum. University of Wisconsin.

Contractor Petersen a Busy Man

H. L. Petersen, a well known San Francisco contractor, with offices at 111 O'Farrell street, has recently completed a very creditable piece of work in the erection of a three story reinforced concrete building on Sacramento street for the Bauer-Schweitzer Company. The plans were by O'Brien Bros., architects. The building is one of the best constructed reinforced concrete structures in San Francisco.

Another building put up by Petersen that has called forth considerable praise is a three story concrete structure on Howard street, between Fourth and Fifth streets, designed by Coxhead and Coxhead. It will be finished in another month. Mr. Petersen is doing the foundation work for a three story building at the corner of Bush street and Mary lane from plans by Architect T. Patterson Ross and Engineer Bergren. The Empire Malt house on Chestnut street, between Powell and Mason, is another creditable piece of work recently finished by Mr. Petersen and his company of experts.

Aquabar

Aquabar is a waterproofing that waterproofs. It is manufactured by the American Cement Waterproofing Company, 12th and Noble streets, Philadelphia. Write them for booklet. Experts have tested aquabar, engineers and builders have used it, and practical men in all branches of constructive work testify to the efficacy of aquabar in waterproofing cement and cement structures, and find it to be the only material that will thoroughly and permanently serve the purpose of its invention and produc-

It is a water-like solution of such composition as will never evaporate from or lose its obstructive qualities in cement or concrete work from age, and while slightly retarding the rapid setting of cement when tempered therewith, it in nowise affects or depreciates the strength.

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Architects, engineers and contractors can readily see what a valuable solution aquabar is in the construction of concrete blocks, retaining walls, reservoirs, concrete tanks, tunnels, subways and the basement floors of structures under the water level.

Experiments show that age has no effect on the reliability of another and the strength of cement is no way lessened by its use.

Experts have tested it and pronounced it the only waterproofing of an impervious nature. This solution can be applied by the ordinary labor, does not interfere with the ordinary condition of mixing concrete and no way retards the progress of the work.

The Revolving Doors of the Corbett Building

The revolving doors in the Corbett building, illustrated in the January Architect and Engineer, are what is known as the Atchison Revolving Door, made by the Atchison Revolving Door Company, of Atchison, Kan.

A special feature of these doors that will first attract attention is the curving of the wings. The purpose of this incurving is to afford more space to the foot in passing through the door. This, in the ordinary sized door, amounts to about six inches, affording material advantage to one passing through the door and avoids the necessity for the short step. Another feature of interest in this door is the method of folding the wings aside for summer use.

The intermediate wings are hinged in the ordinary way to the two main wings. The latter are supported from a bronze ceiling hanger in such a way that they separate from it and from each other, leaving each pair of wings free to swing aside on secondary pivots at the outer edge of the main wings. The wings when extended are spread by a drop arm which is considered one of the most valuable details, giving a spreading effect of any desired force. Thus the revolving structure is very solid and free from shake and clatter.

The operation of swinging the wings aside requires about forty seconds, and consists of: First, dropping the drop arms, which is done without retarding the motion of the door; second, bringing one of the main wings to proper place and setting the top and bottom pivots, through a half turn of the handle wrench in the operating mechanism at the middle of the stile; third, release the same wing at the center by using the same wrench to unlock the wing, both top and bottom, simultaneously from the hanger and the other wing; fourth, push the pair of wings aside toward the casing wall just as an ordinary door is opened; fifth, perform exactly similar operations on the other pair of wings, the only difference being that here the main wing is unlocked from the hanger by the same operation that withdraws the central bottom pivot. Setting the door up to revolve consists of reversing the whole operation. Setting the wings aside takes considerable less time than the telling, and the ease and simplicity of the operation is admirable and astounding to the onlooker. Not a pound weight is lifted, the wings are not rolled aside, but simply swung as in any other door on a D. A. hinge.

The hanger and bearing of the door are extremely simple, consisting of a standard steel channel supported across the ceiling at any angle whatever, and a suitable ball-bearing set stationary in the center of the door and carrying the polished bronze hanger piece. This hanger is always in place, and the ceiling has no slot or other openings of any kind.

In minor details, may be mentioned, the spring-closed floor pivots, avoiding the necessity of cleaning out sockets whenever the door is to be moved; the method of constructing casing walls in one piece instead of two, avoiding the unsightly vertical joint and keeping the curvature intact through building up on sawed cores; the small depth of ceiling required by the hanger, being a minimum of 5½ inches and permitting the connection of the door to very narrow transom bars without the use of any boxes above the roof; the ability to hang D. A. or single acting screen or veneered doors directly on the casing walls without interference with revolving structures.

Any of our readers wishing to enter more fully into the details of construction of this door should request the manufacturers to send them their Catalogue "A", which gives detail drawings and full information.

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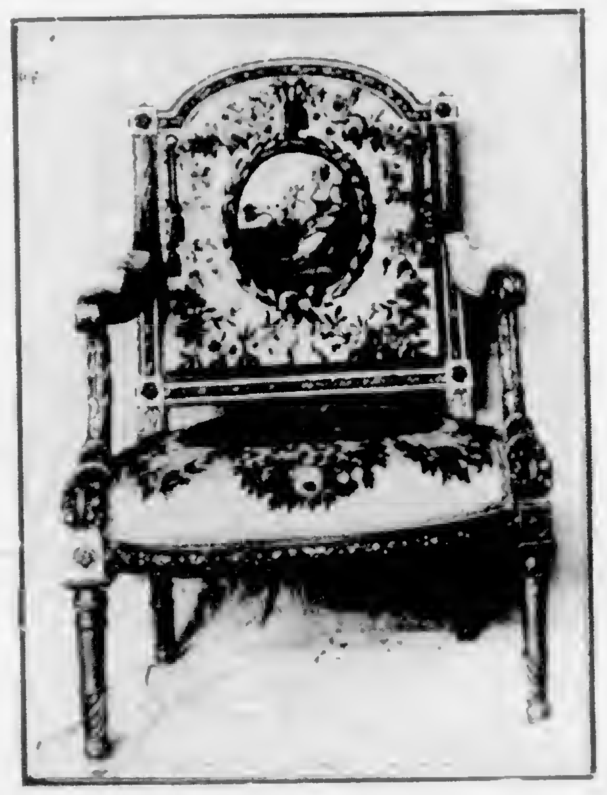

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About Bay State Brick and Cement Coating

Concrete and cement in various forms are rapidly coming into use in structural work, owing to great strength and indestructibility as well as ease and cheapness of construction.

A great drawback, however, is the dead monotony of such surfaces as well as liability to staining and differences in color owing to intermissions in construction and to changes in the ingredients composing the material.

Attempts to correct this defect by incorporating coloring matter in the plastic mass are generally ineffective and deteriorating, while the use of cold water paints and lead and oil paints is equally so, owing to the damp surfaces encountered, as well as the elements contained in the concrete itself, which cause chipping, peeling, and dusting in a short time.

Bay State Brick and Cement Coating is a perfect coating for the perfection and decoration of such surfaces and also of brick and plaster, being composed of a cement base held in suspension by a volatile oil which evaporates on application.

This construction causes it to penetrate the surface of the above mentioned materials and become a part of them and not a mere skim coating. It contains no lead, and its snow-white surface is not affected by acids and gases. It contains no glue, caseine, or water, and does not mildew, rub, crack or peel. It is not absorbent and will not change color when wet, and will stand steam and moisture on its surface without injury.

It is also so made that it may be applied to a damp surface where it is impossible to make other paints stay. This particular feature, we believe, is not possessed by any other paint in this country. It dries with a dull finish and is made in white and colors.

Bay State Brick and Cement Coating is a finish coating designed for the decoration and protection of cement concrete plaster, and brick surfaces on interiors and exteriors of all kinds of buildings, mills, garages, dwellings, air shafts, etc.

See advertisement on another page of this magazine for addresses of agents.

Write for a Koppel Booklet

Another attractive booklet has recently been issued by the Arthur Koppel Company, describing its industrial, narrow and standard guage railway materials. This company has established permanent quarters on the Pacific Coast, the address being the Chronicle building, San Francisco. Information regarding any of the supplies carried by this leading house will be cheerfully furnished

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on application and a postal card will bring you a handsome booklet describing and illustrating the Koppel goods.

What You Want

The National Cement Machine Company of Bay City, Michigan, has placed on the market a lintel machine that operates like a face down block machine. It can make any solid block wanted, and any size up to 12 inches square or 72 inches long or longer if needed. It is the only lintel machine made that permits the operator to examine the face of the block as soon as made. Every block maker knows the enormous advantage of being able to see the face of block while it is green.

You can bevel any side of block to any degree wanted. The machine is quickly adjustable.

These features make it just what you must have for window and door caps and sills and steps.

There is practically no limit to the different kinds of blocks that can be made on the National lintel machine.

Dissolution of Copartnership

Arthur Priddle and John McGuigan have dissolved copartnership. John McGuigan to retain the name of John McGuigan & Co., and to take over the business in sidewalk lights and waterproof doors only; all contracts and business in metal fireproofing and metal lathing, etc., was taken by Mr. Priddle and is now owned exclusively by him, and he is at the present time running this branch of the business under the name of "Aetna Fireproofing Co."

Concrete Apartment House

A selected number of architects are preparing designs for a reinforced concrete apartment house to be built at the corner of Isabel avenue and Ocean Front boulevard, San Diego, for U. S. Butler, a Nevada mining man and owner of an eighty-foot frontage on Ocean Front. The proposed building will be 80 by 100 feet, and contains 100 rooms. The estimated cost is $150,000.

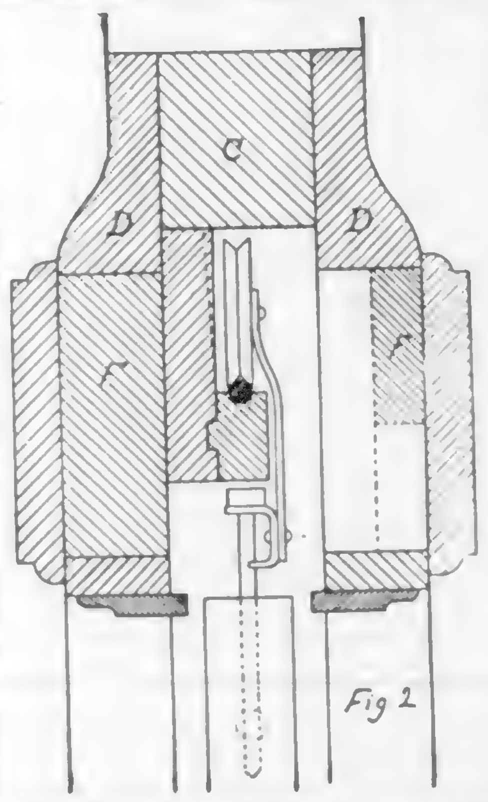

Fig 2

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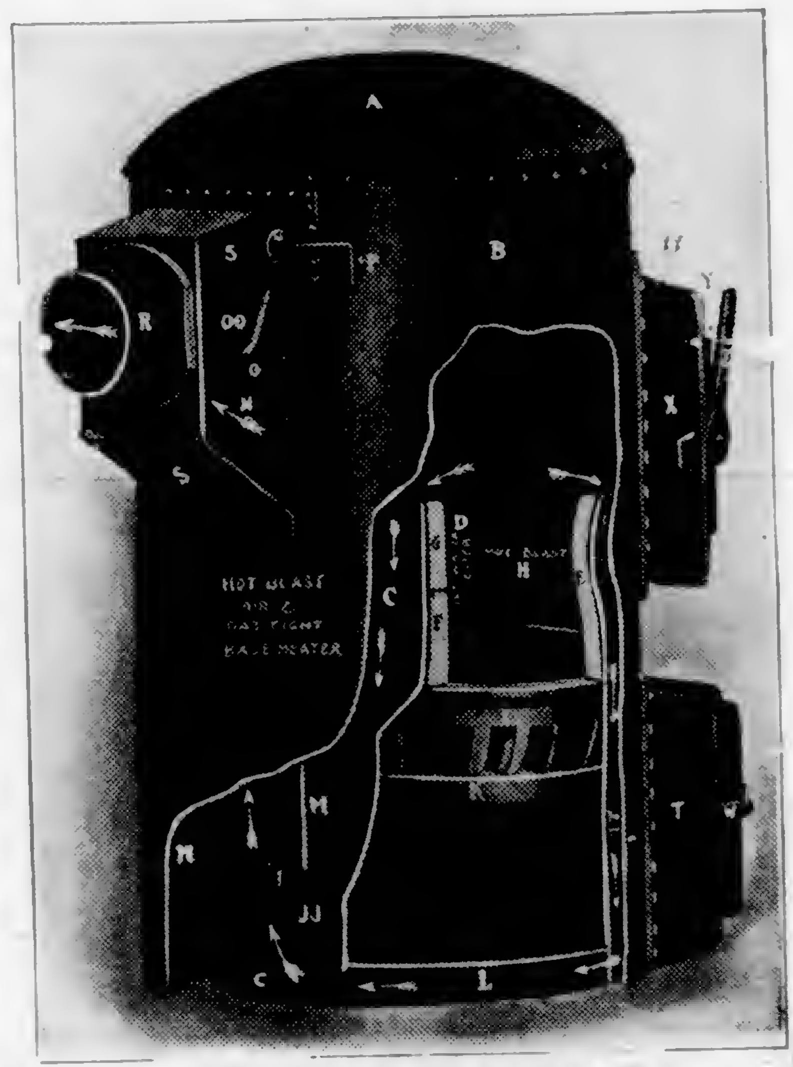

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New Advertisers Not Noted Here Will Be Classified Next Month

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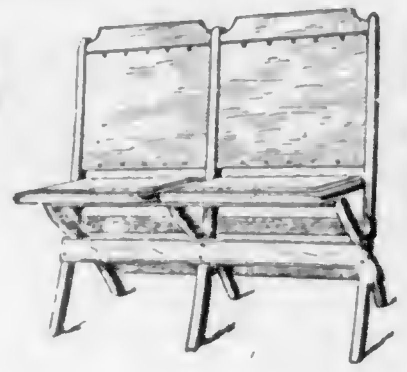

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The Munich Art Glass Company has established Pacific Coast offices at 510 and 512 Turk street, San Francisco, and has a corps of artists and an equipment that will enable the company to handle the largest and most exacting job offered by any Pacific Coast architect. Heretofore much of this big work has been done in the East. Gustave Baumstark is the manager of the company which should be sufficient guarantee of its ability to turn out first-class work. Among the notable buildings having stained glass windows executed by Mr. Baumstark might be mentioned the St. Agnes church, Satonville, Md;. Clark Memorial church, Baltimore; St. Aloysius church, Washington, D. C.; Arlington Hotel, Washington, D. C.; Capitol building, Washington, D. C.; Heidelberg Cafe, Salt Lake City, and General A. E. Booth's residence, Baltimore.

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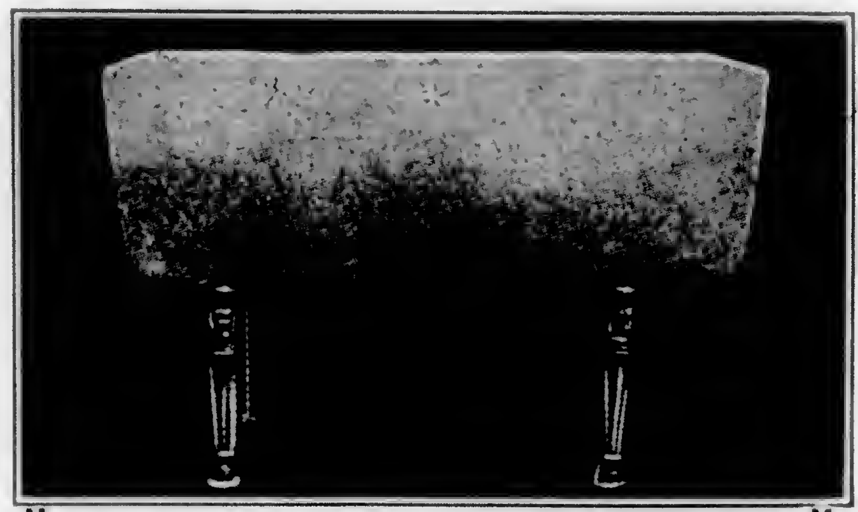

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Cal. Fruit Can. Assn.
Cal. Wine Association
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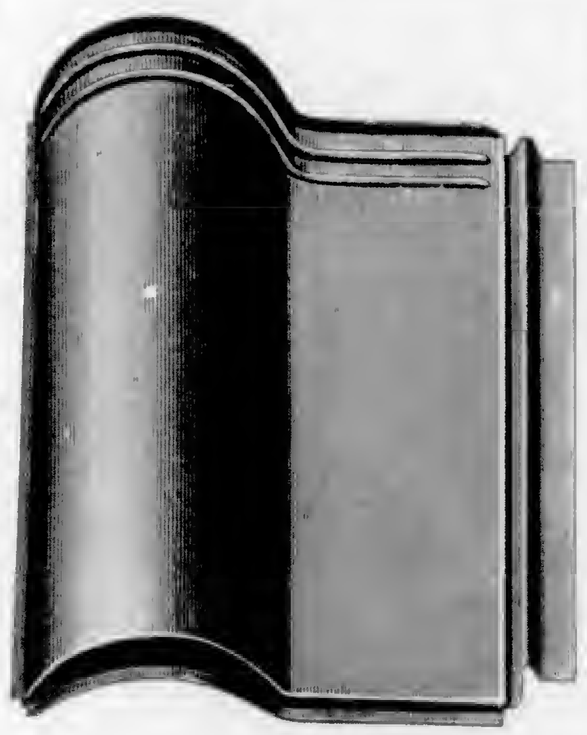

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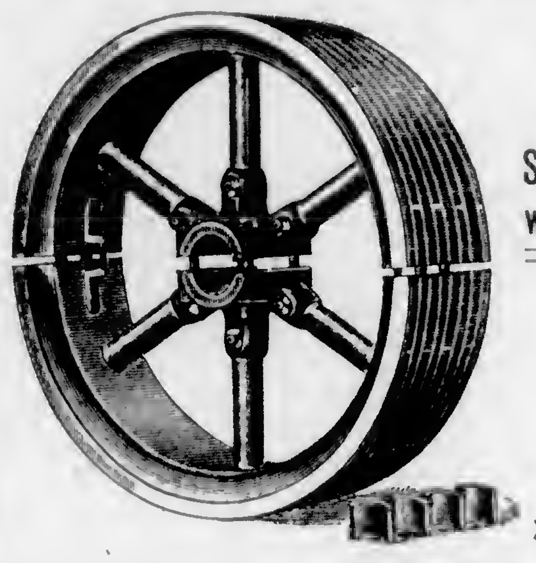

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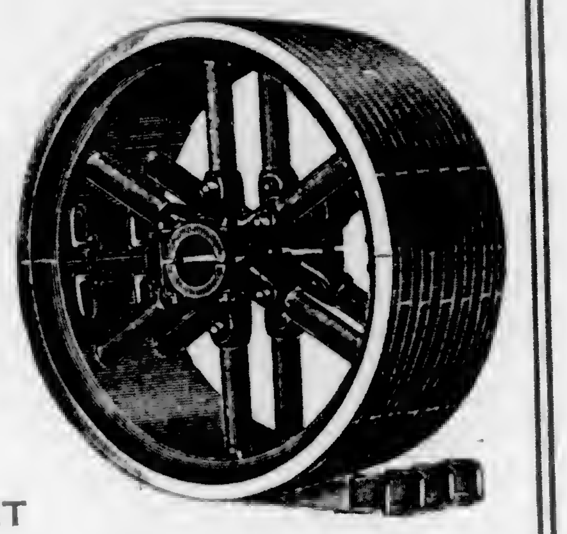

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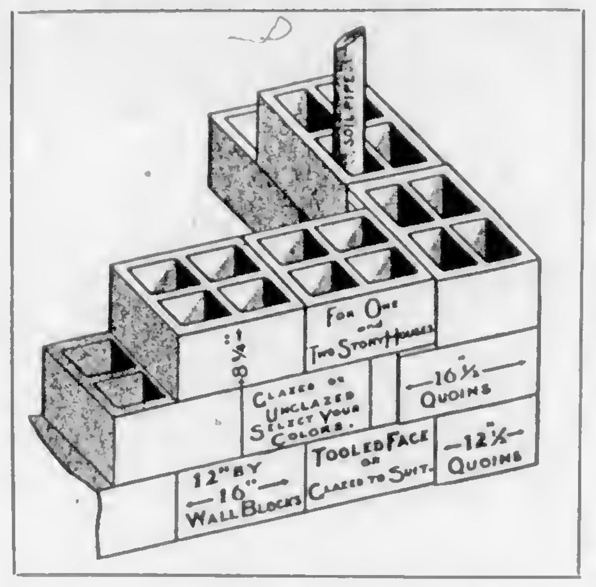
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Mangrum & Otter's New Home

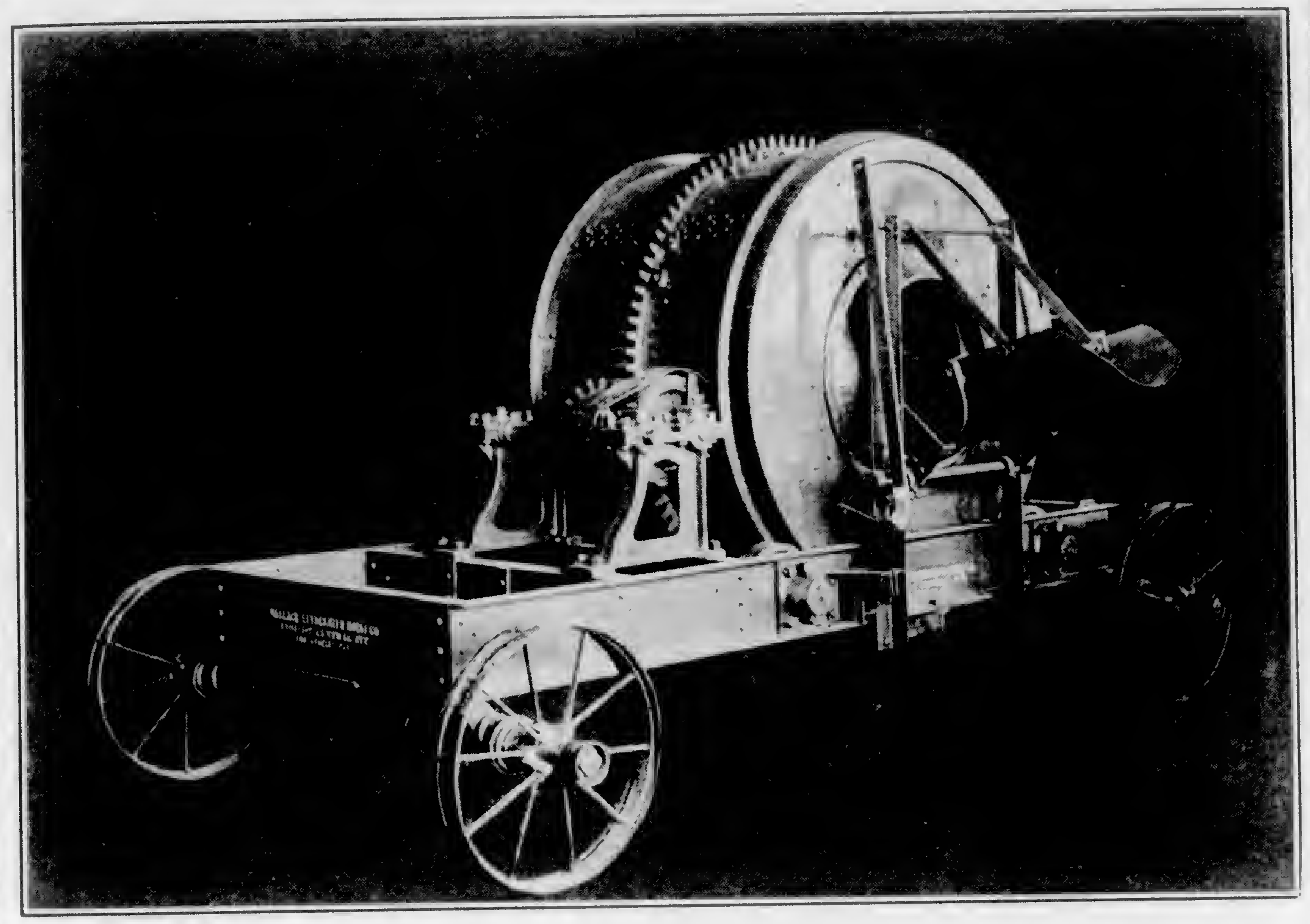
For real enterprise and progressiveness no firm in San Francisco has it on the Mangrum & Otter Company, heating and ventilating engineers, and dealers in tiles, mantels, grates, etc. Mr. Mangrum takes considerable pleasure, and well he might, too, in proclaiming himself one of the first in his line of business, to get back into the harness after the great fire.

A hastily constructed shack afforded the company temporary accommodations until conditions permitted several substantial additions. Business increased so rapidly that the need of larger and more substantial quarters became absolutely necessary and the management was casting about for a desirable location when fire swept away the temporary buildings and a considerable portion of the stock.

Undismayed and with the same pluck and progressiveness that marked the company's actions after the big fire, new quarters were secured—this time of a more permanent character—new stock was ordered and today Mangrum & Otter occupy a five-story building and basement with every department a complete business in itself, competent heads in charge and stock enough to answer all demands for some time to come. The firm's new home is at 561 and 563 Mission street, almost directly opposite the old bulidings that were partly destroyed. The new building is owned by Mr. Holbrook and is a well-built structure, semi-fireproof, with everything arranged to suit the convenience of the tenant. A ten-years' lease, with privilege of an extension, has been secured. All told the company occupies about 40,000 square feet of floor space. On the ground floor are the general offices and the heating and engineering department, in charge of F. W. Howard. Mr. Howard was brought to the Coast by Mr. Mangrum from Boston, where he was classed as an expert in heating and ventilating. He has made the company many friends since coming to California, his work having given universal satisfaction.

Others who have assisted Mr. Mangrum in bringing the business up to a high standard are Charles C. Hanley, the secretary, and N. B. Herndon, treasurer.

The mantel and tile department is on the second floor, the stock room is on the third floor while the top floor has been converted into a tin shop and sheet metal factory. Expensive machinery has been installed here, and there is no kind of galvanzied iron or sheet metal work too difficult for the artists on this



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" " " 121 So. Monroe Street - Spokane, "
" " " Front and Ankeny Streets - Portland, Ore.
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floor to cope with. The pipe shop is in the basement.

The Company handles the Magee furnaces, steam and hot-water boilers of the same make and the Holland radiators. A large warehouse for the heavy stock and surplus fittings, is maintained at Mariposa and Minnesota streets. Following is a partial list of some of the more important buildings heated by Mangrum & Otter since the fire: Stewart Hotel, Geary street; Monarch Hotel, Golden Gate avenue; Kirk Hotel, Haight and Stanyan streets; Santa Cruz Beach Company's pavilion and bath house, Santa Cruz; Hotel Vendome, San Jose; Kragen's building, Market street; Shawmut building, Mission and First streets; St. Xavis apartment house, Pacific avenue, near Fillmore; apartment hotel, Polk and Ellis streets; Apache building, Mason and O'Farrell; Valencia Hotel; Overton Hotel, Santa Rosa; Laudeback Hotel, Eddy and Leavenworth streets; McGee building, Market and Geary streets; Marin county bank, San Rafael; Calkins' building, Battery street; Drexler building, Montgomery and Minna streets; Schroth Estate building, Stockton street; Western Realty building; Home Telephone building, Howard street; Hirsch & Kaiser building; Underhill building, Montgomery and Marchant; Boas building, Montgomery near Sacramento; G. H. Buckingham residence, Scott and Green streets; Postal Telegraph building, Grant avenue and Sutter street; Dr. Taylor residence, Redwood; Luning building, California and Drum streets; Rosenstock & Nuttall building, Geary street; Thompson and Ortman buildings, Montgomery and Post streets.

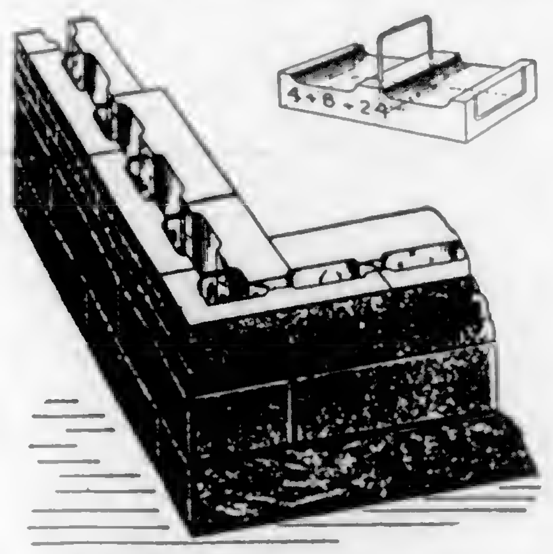
Hotel Costs Twice Its Estimate; the Builders Sued

The Edward Barron Estate Company has sued the Woodruff Construction Company and S. H. Woodruff, its president, for $300,000 damages, alleged to be due for failure to construct a building at Geary and Taylor streets, San Francisco, within the sum specified.

According to the complaint the defendants were to build a hotel for the plaintiff at the location named for $300,000, but subsequently the price was increased to $400,000, by alterations demanded by the owners and prospective tenants.

After the work on the structure had proceeded for some time, the complaint says, the plaintiff was informed that the structure would cost greatly in excess of $400,000, and work was stopped.

Subsequently the estate company secured experts to look at the portion of the building completed and, the complaint says, the experts reported it would cost $700,000 finished.



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Is Made of Two Distinct Blocks
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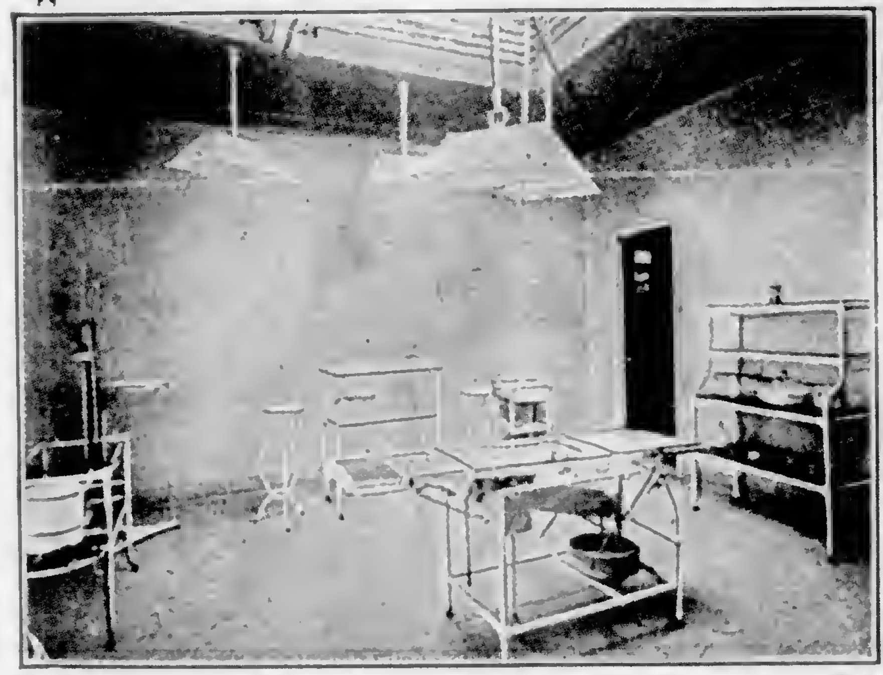

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From a Sanitary standpoint it is difficult to improve upon this operating room. Not a crack or crevice large enough to hold the most minute particle. These Ripolin-covered walls will be as white and unbroken in a few years as they are to-day.
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ALSO
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Room 15, 42 MARKET STREET
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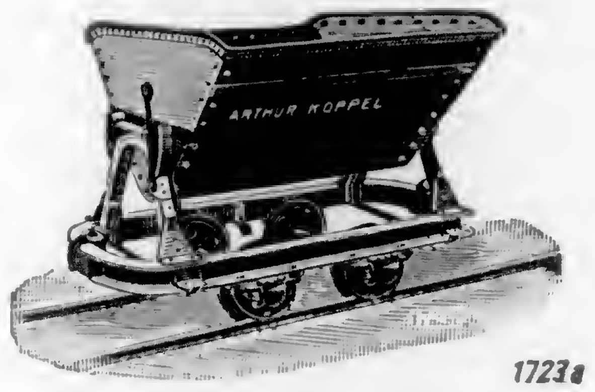
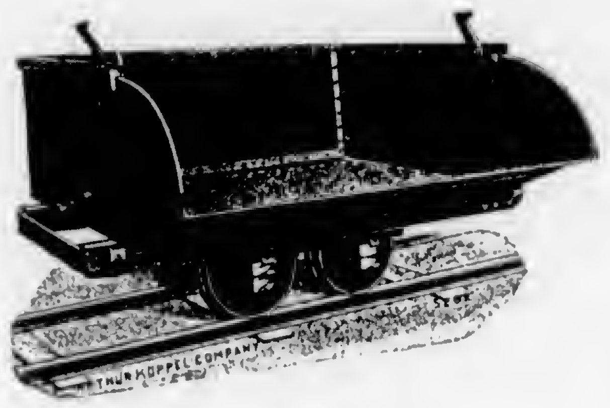
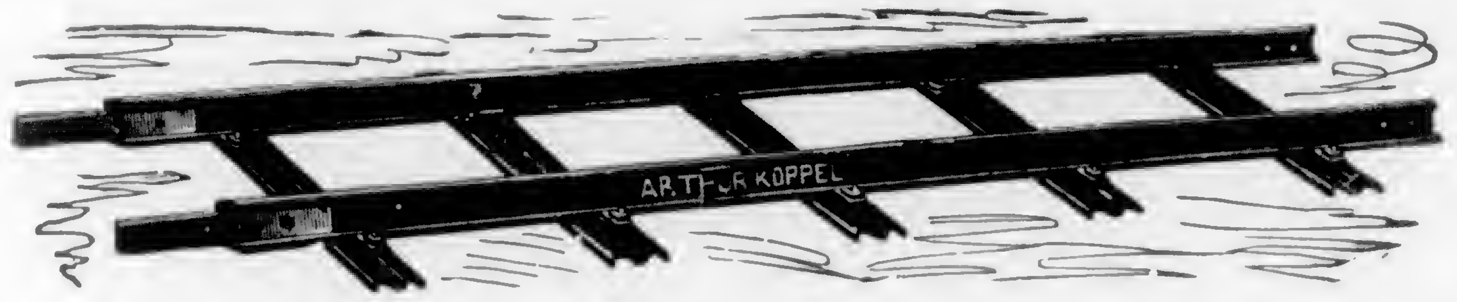
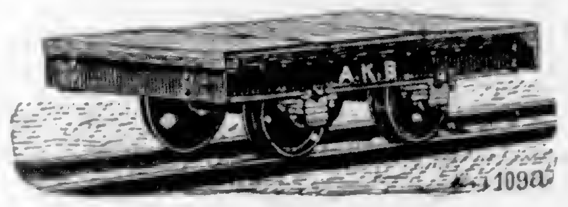




Contractors, Brick and Cement Manufacturers, Stone Quarries or any engaged in construction work who employ Wheelbarrows, Scrapers or Carts, can materially increase their profits by using the Koppel Portable Track and Equipment.



KOPPEL PORTABLE RAILWAYS



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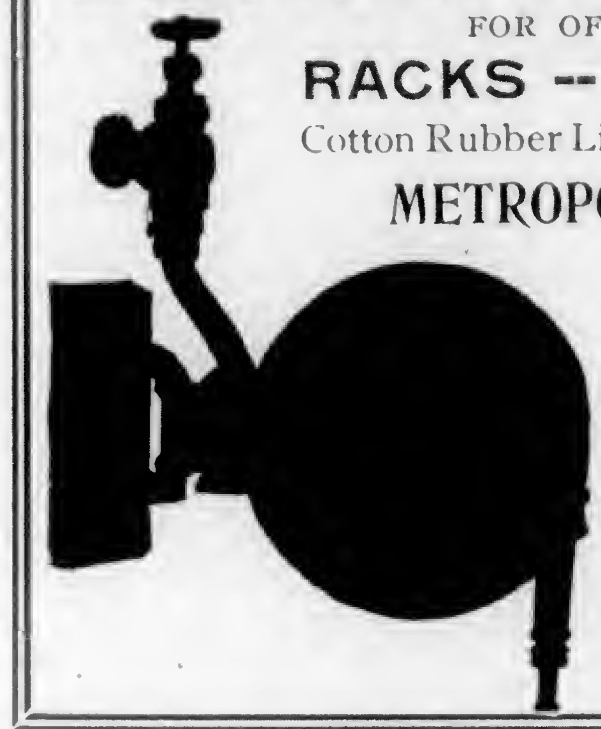

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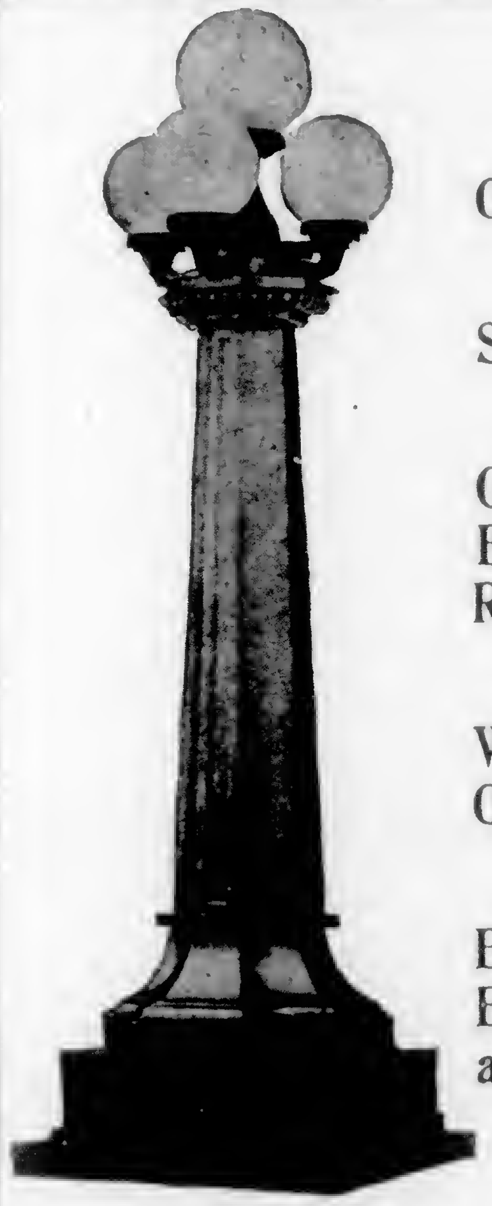

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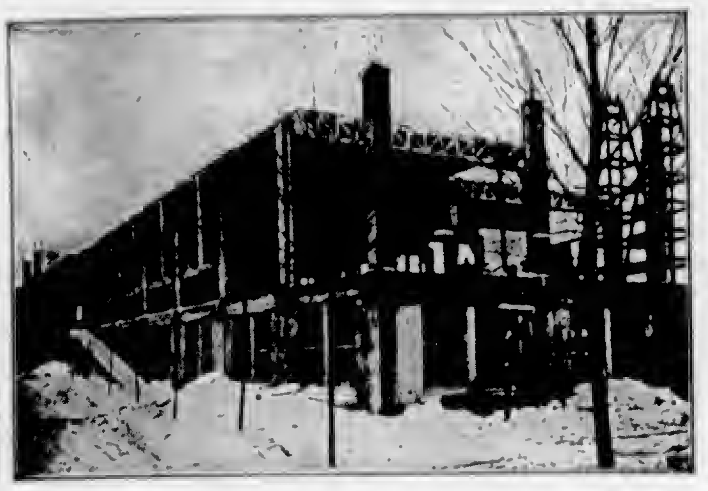

Exterior of Building

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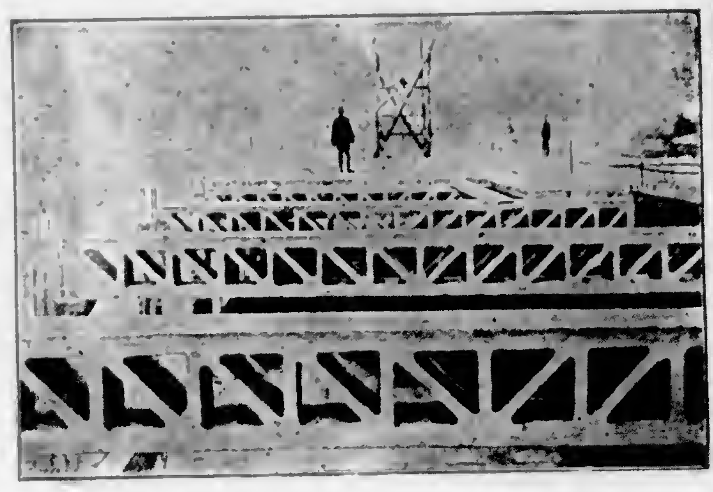

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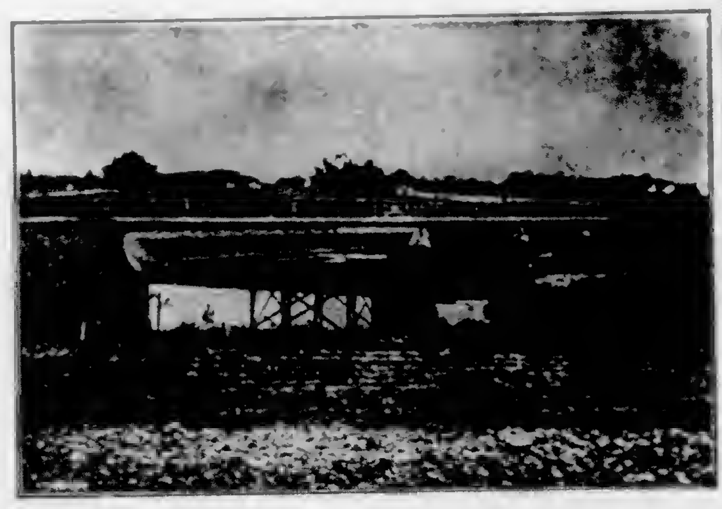

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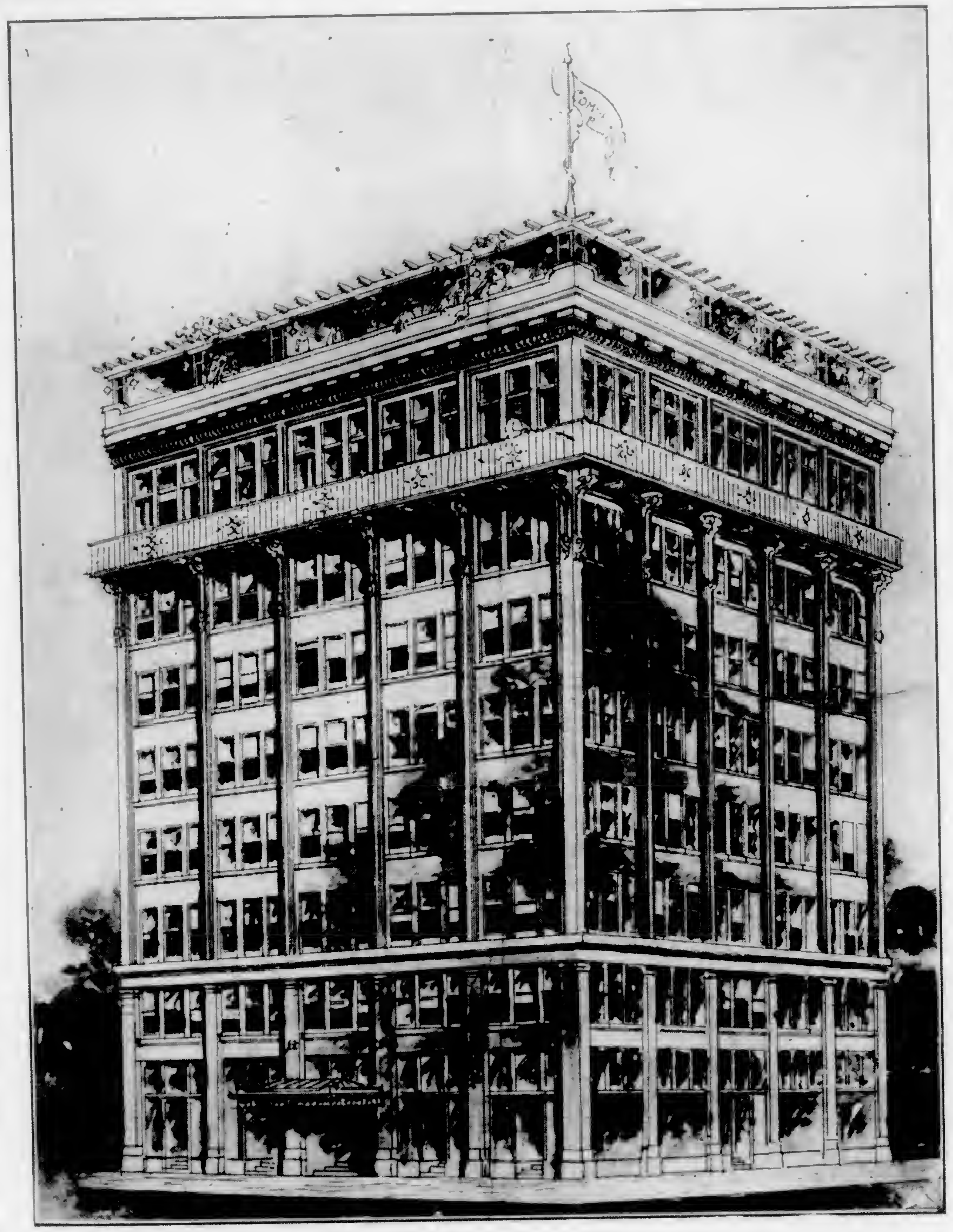

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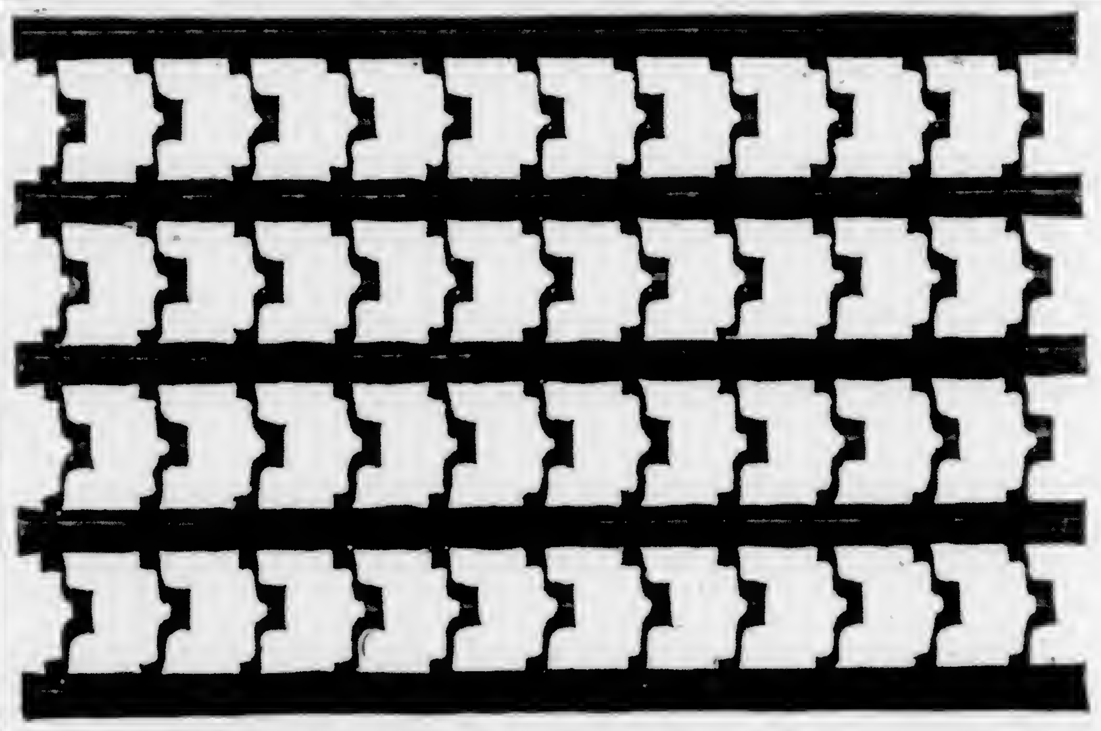

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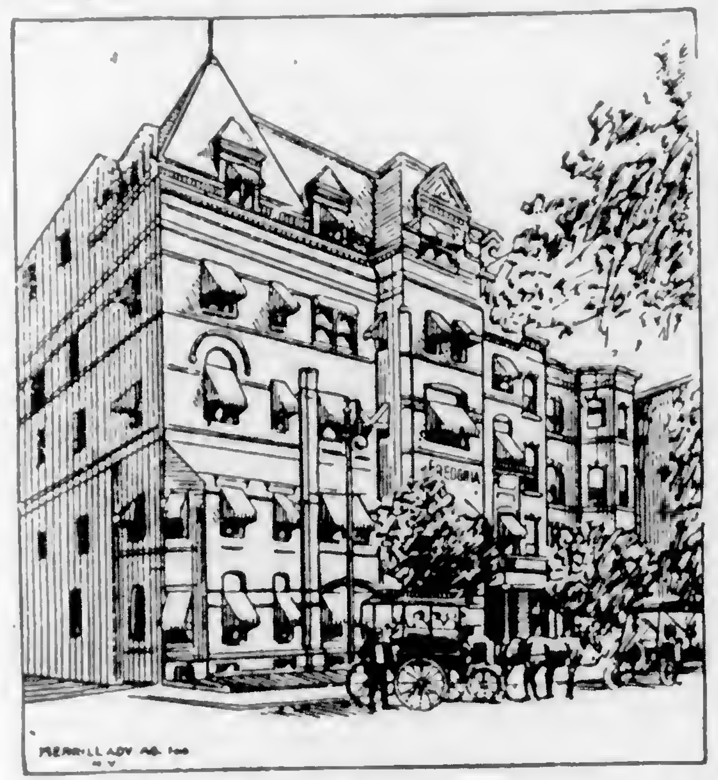

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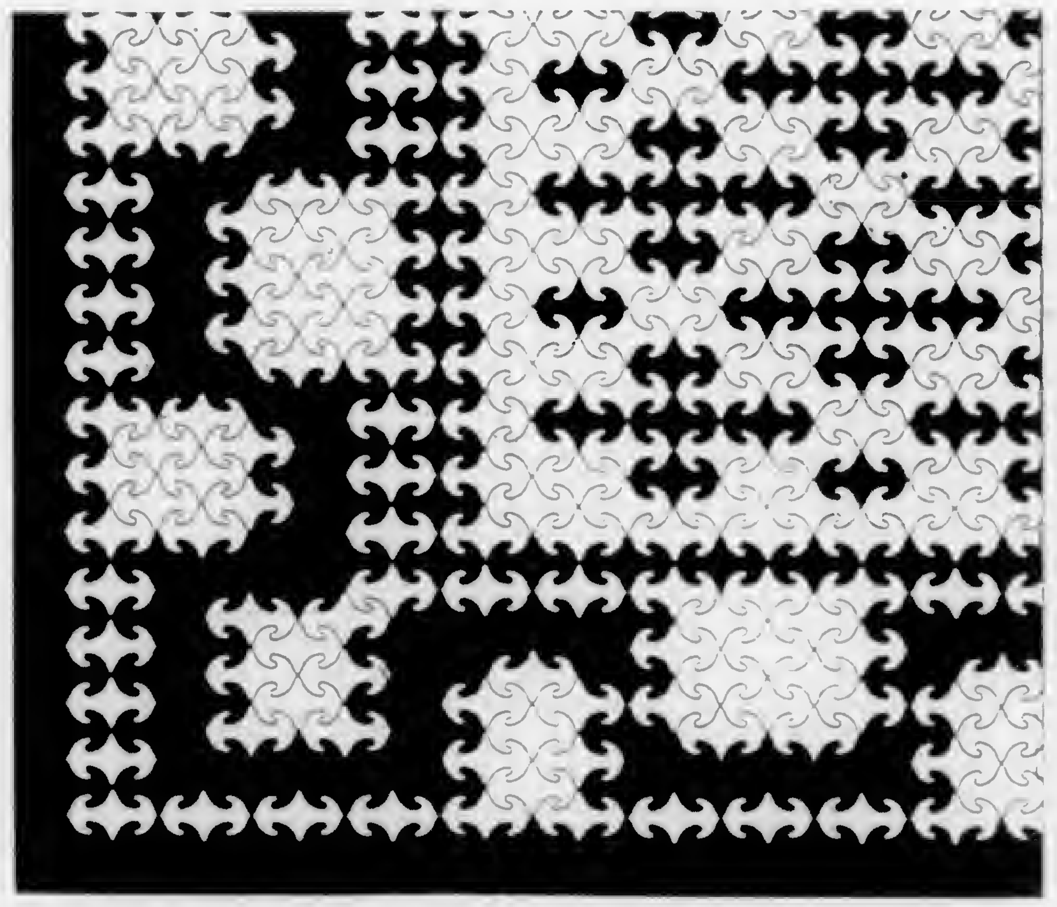

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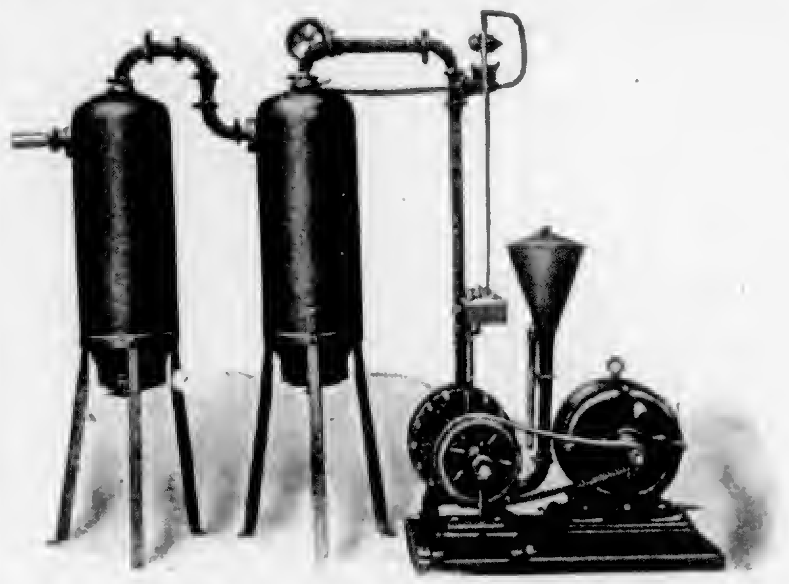

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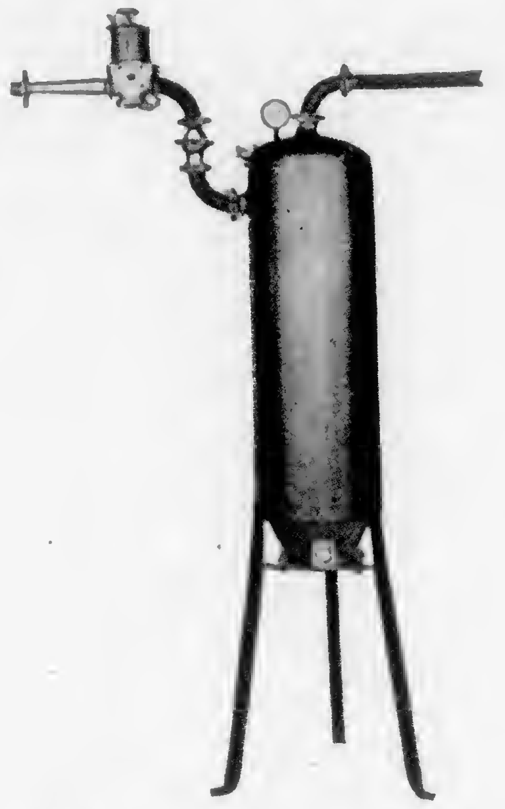

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Requires but little space.
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Vacuum always "on tap".
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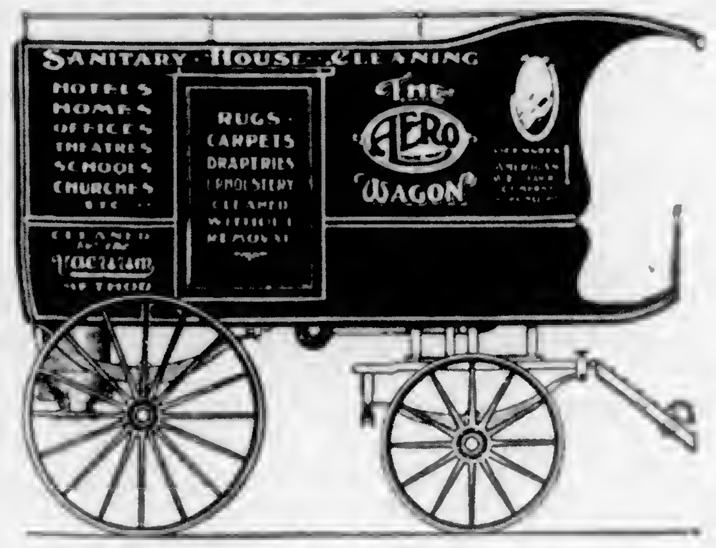

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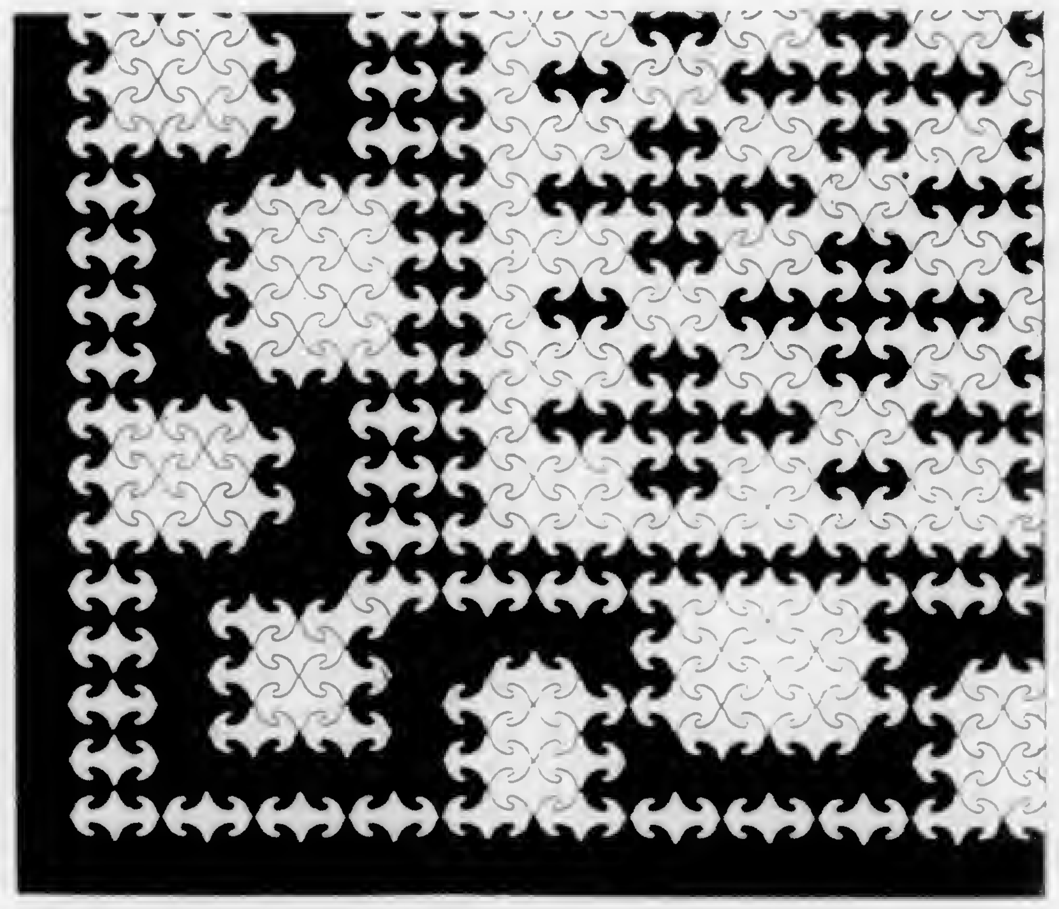

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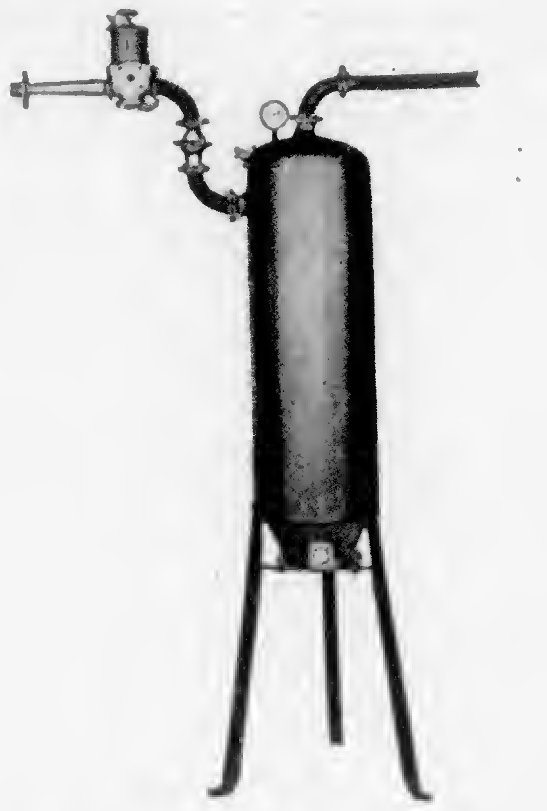

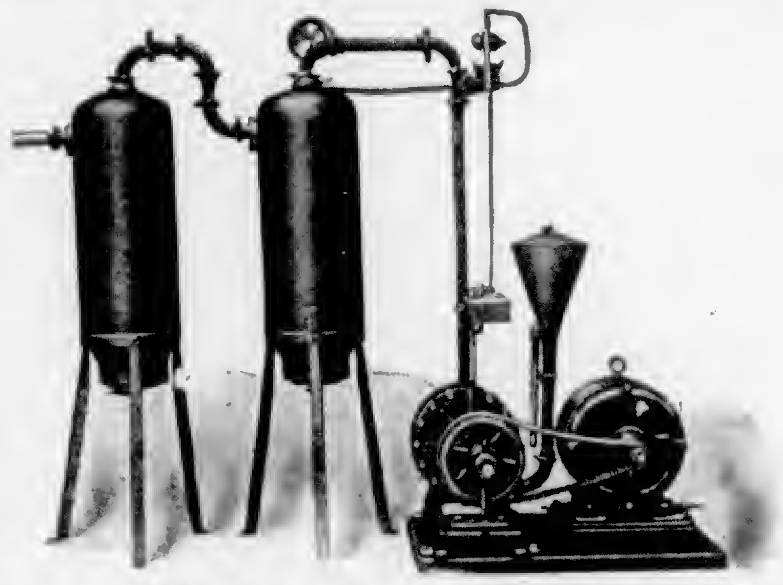

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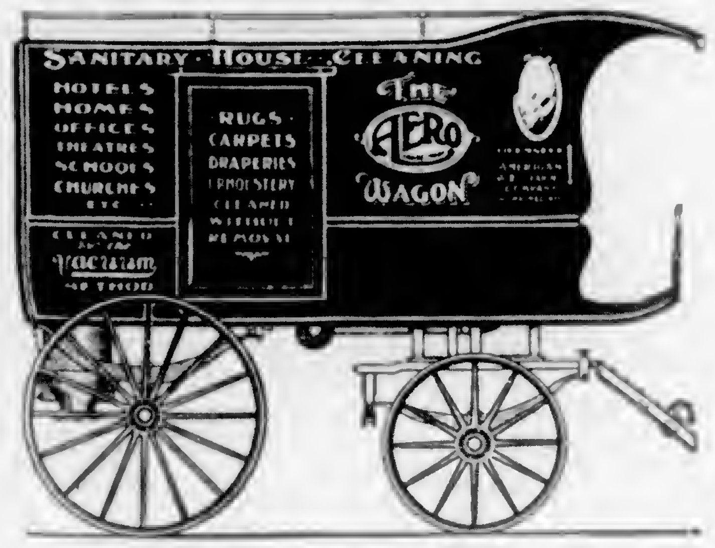

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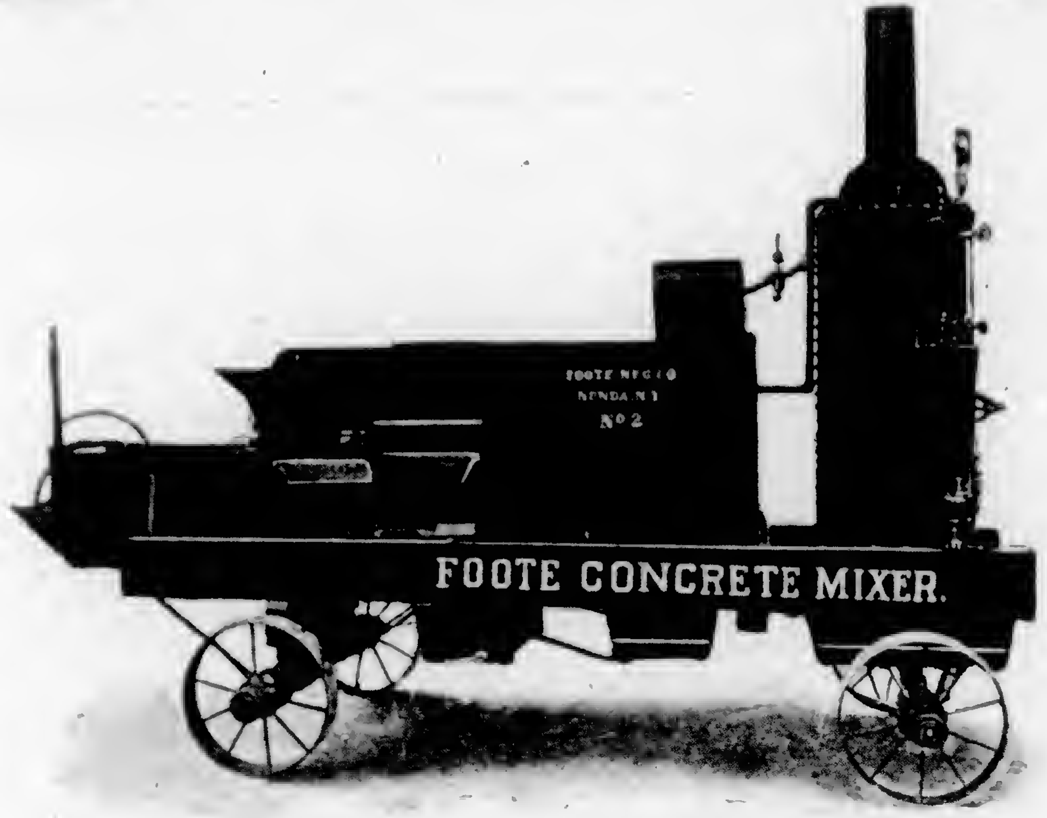

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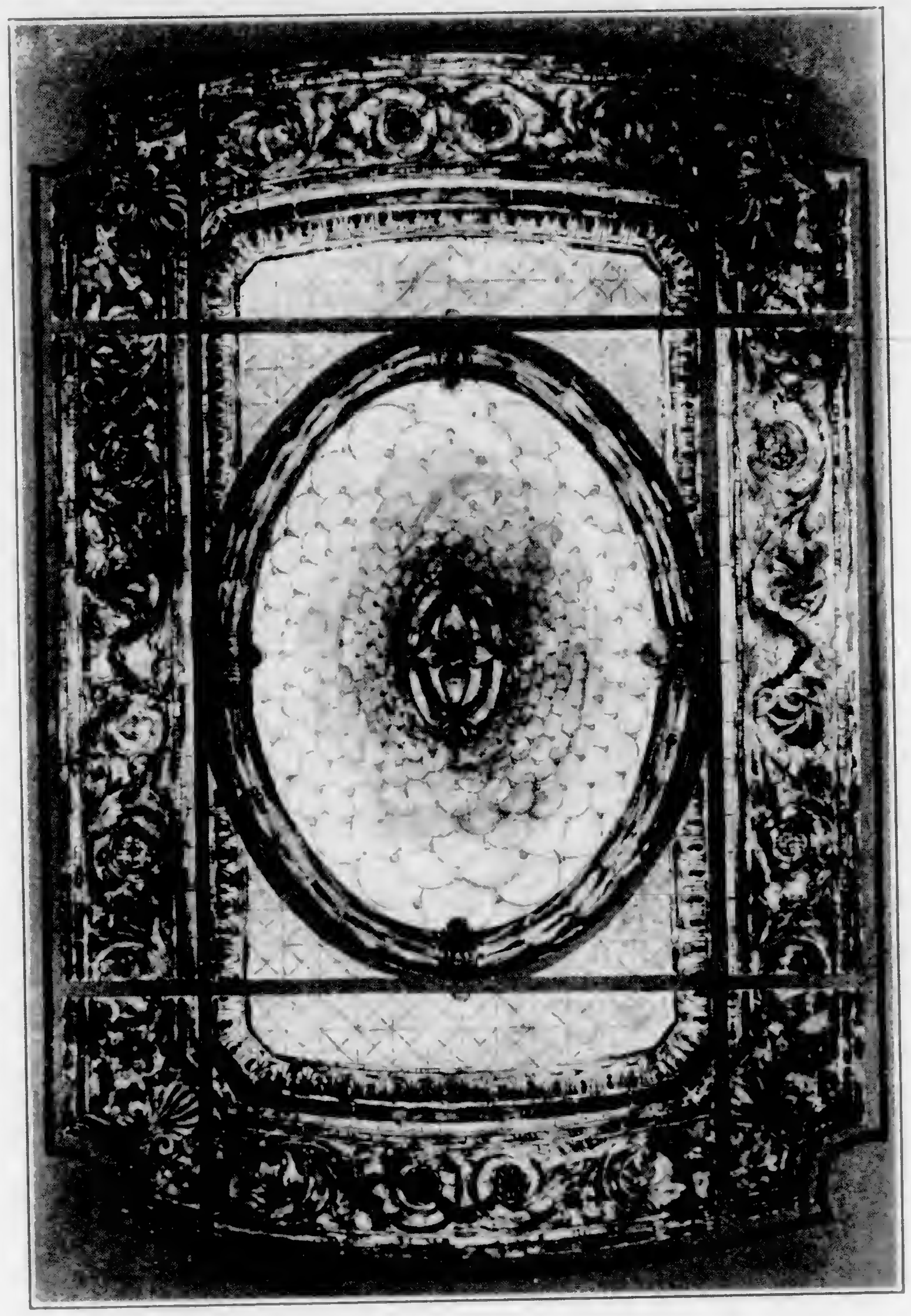

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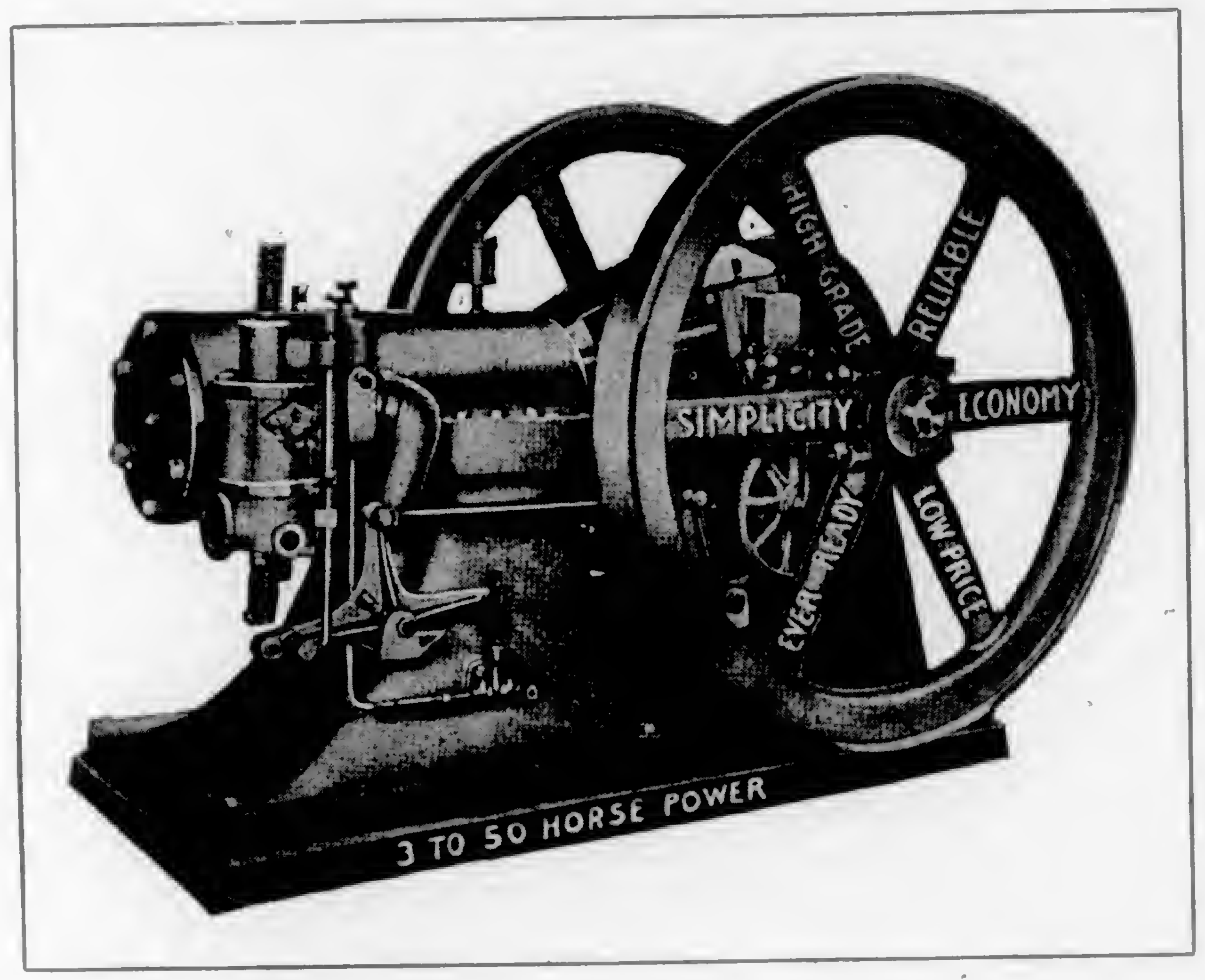

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Others who have done work or supplied material for Architect Buchanan are the Los Angeles Art Glass Company, Pasadena Manufacturing Company, W. F. Creller, plumber; Gauahl-Deires Lumber Company; Kerckhoff-Cuzner Lumber Company; Cockley & March, plumbers; T. J. De Huff, plaster contractor; Charles Ward, painter and decorator; L. W. Blinn Lumber Company and D. W. March, general contractor.

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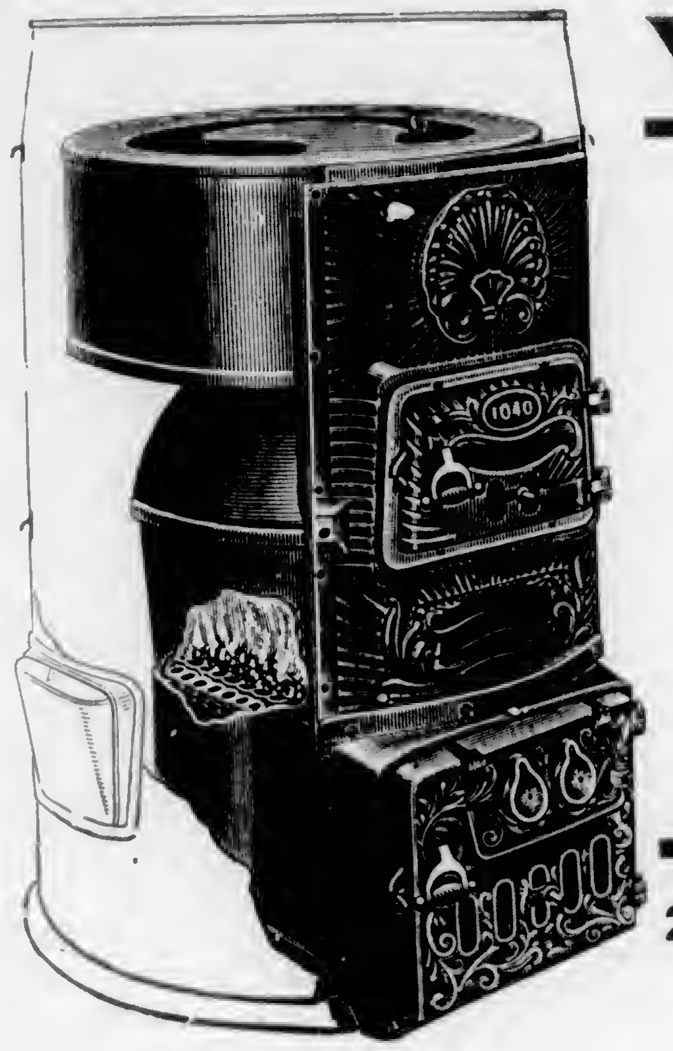

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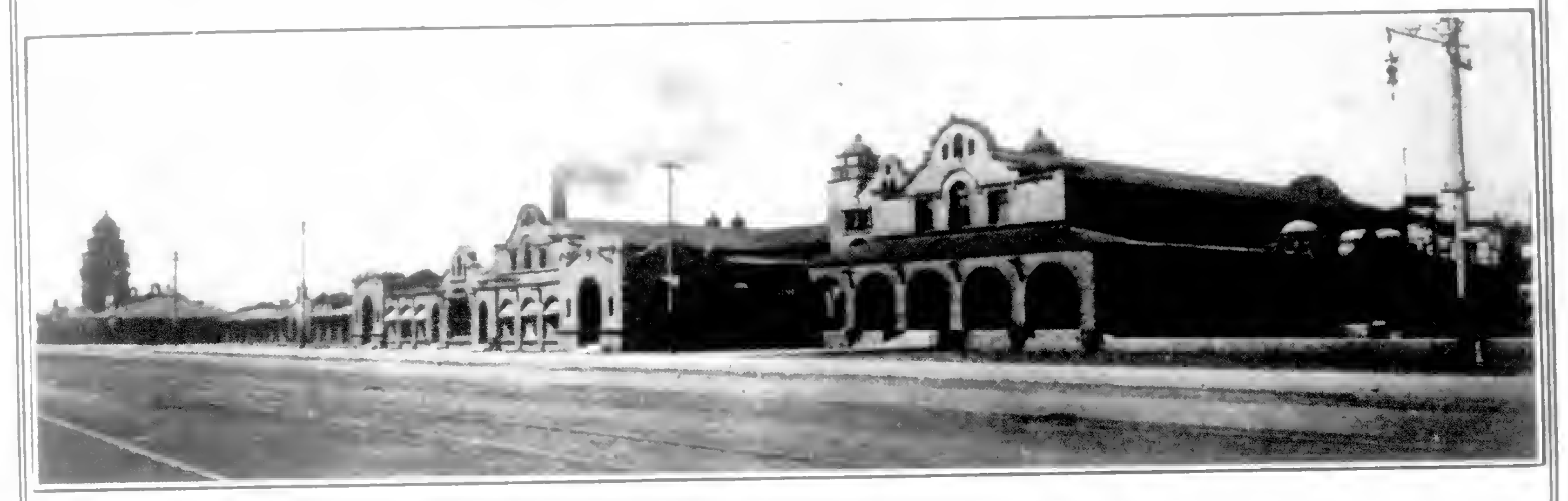

Santa Fe Hotel and Station at Albuquerque N. M.
Chas. F. Whittlesey, Architect

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CHAS. F. WHITTLESEY, Architect

Frontispiece, The Achitect and Engineer
March, 1908

THE
Architect and Engineer
Of California

Vol. XII. MARCH, 1908. No. 2.

Reinforced Concrete Construction — Why I Believe in it

By CHAS. F. WHITTLESEY, Architect.

The Auditorium Building Illuminated

WHY do I believe in reinforced concrete construction?

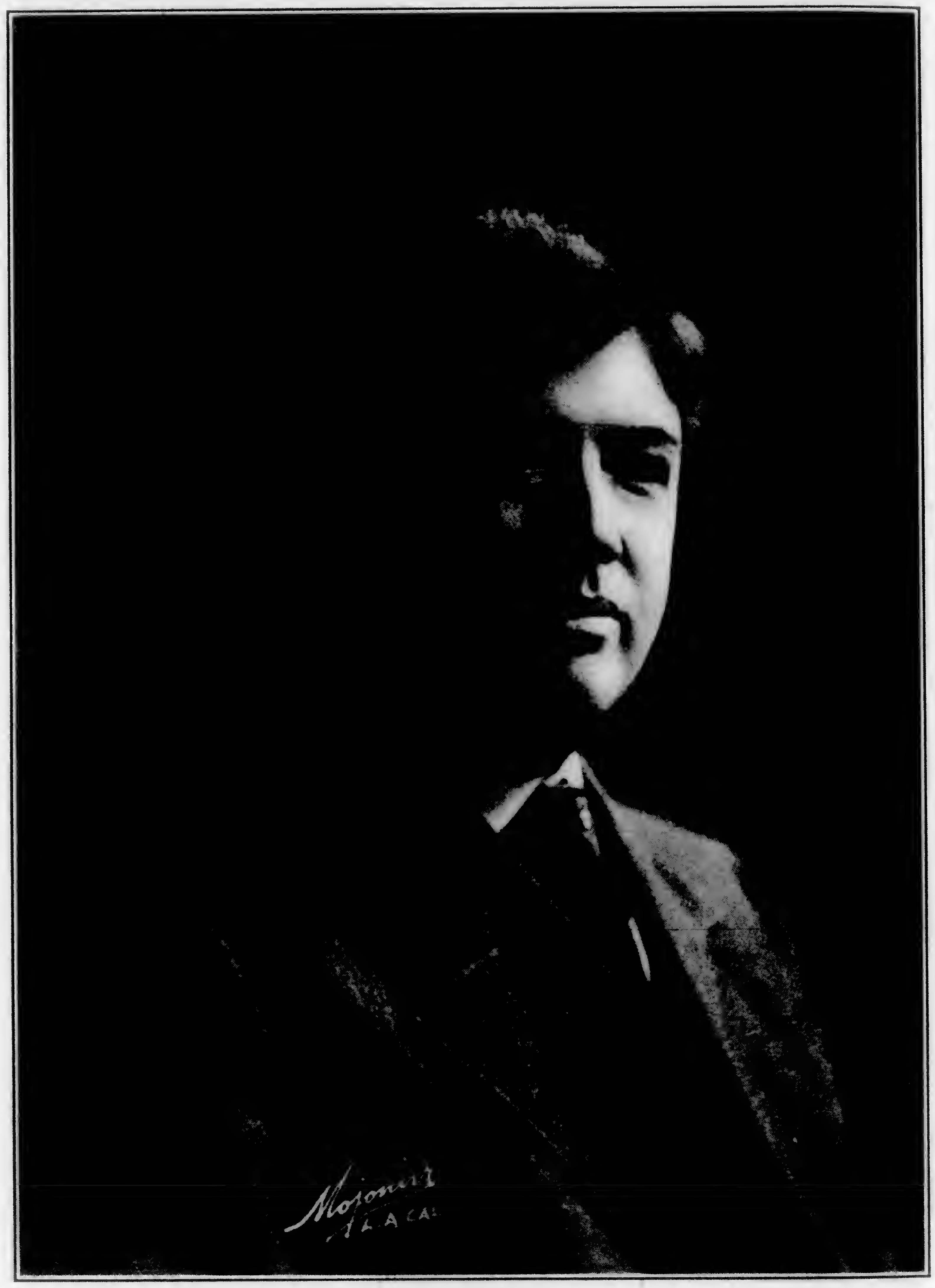
Because it combines economy in cost with maximum strength. Because it is fireproof. Because it permits of rapid construction and finally, because of its lasting qualities.

Reinforced concrete is not a fad—it has come to stay. It is not a new invention. Its first application dates back to the Greeks and the Romans. No material advancement was made in concrete building construction, however, until about the middle of the last century.

Its first application to engineering work was in the construction of water-pipe lines and sewers about forty years ago, and these, some of which have sustained the pressure of a seventy-five foot head of water for many years, are in perfect condition today. Recent examination and tests on them show that the iron rods used for the reinforcement have not corroded to the slightest extent.

From this the use of metal reinforcement in concrete developed rapidly to a wide range of usefulness in all kinds of engineering work, first in bridges and then in buildings. Today its rapid development is more remarkable and is fully as absorbing to the engineering fraternity and the general public as was the introduction of the steel skeleton to building operations in the past quarter of a century.

Today in the United States and Europe there are completed buildings of the greatest magnitude in reinforced concrete. These include factories, flour mills, foundries and machine shops, with heavy traveling cranes running on concrete beams. There are warehouses, smoke stacks, apartment houses, hotels and office buildings, one of which at least is sixteen stories high. There are theatres, museums, churches with immense domes, banks with fireproof vaults,



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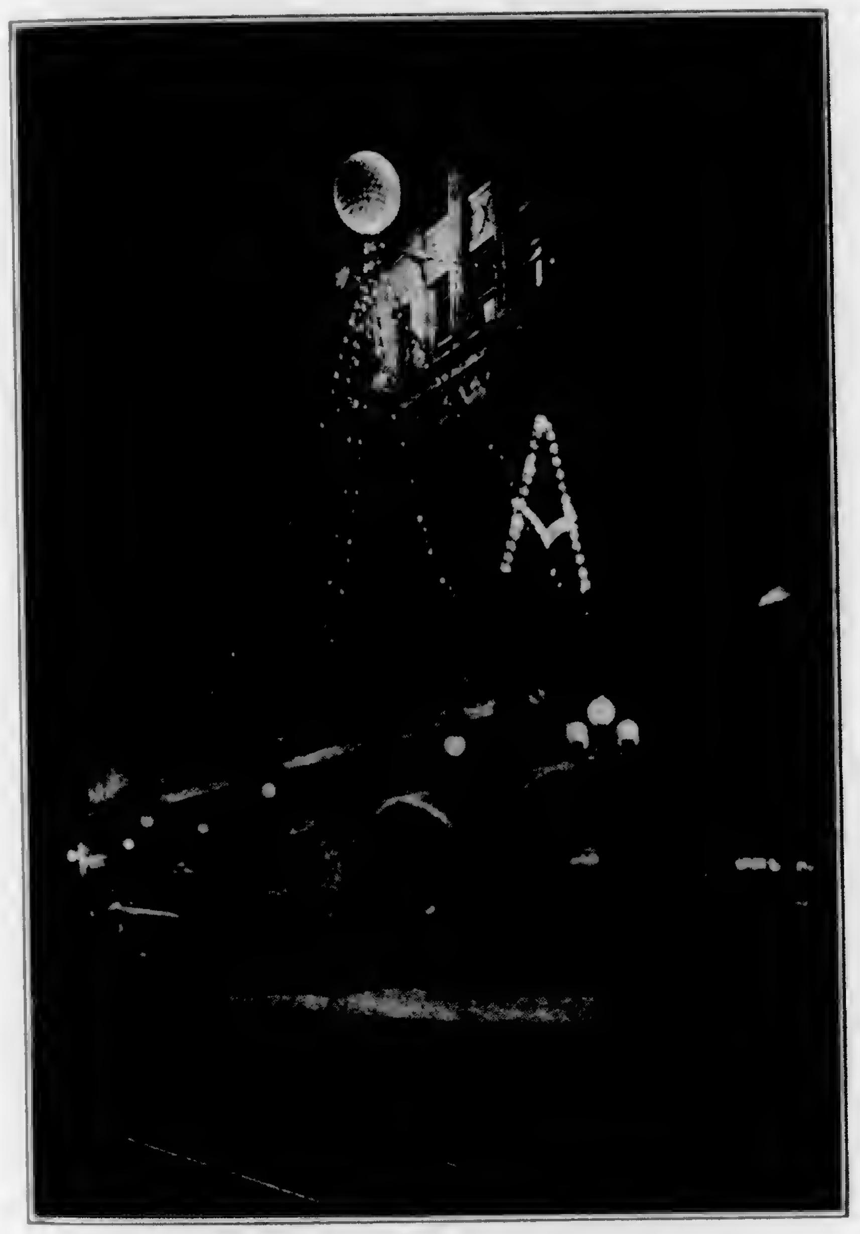

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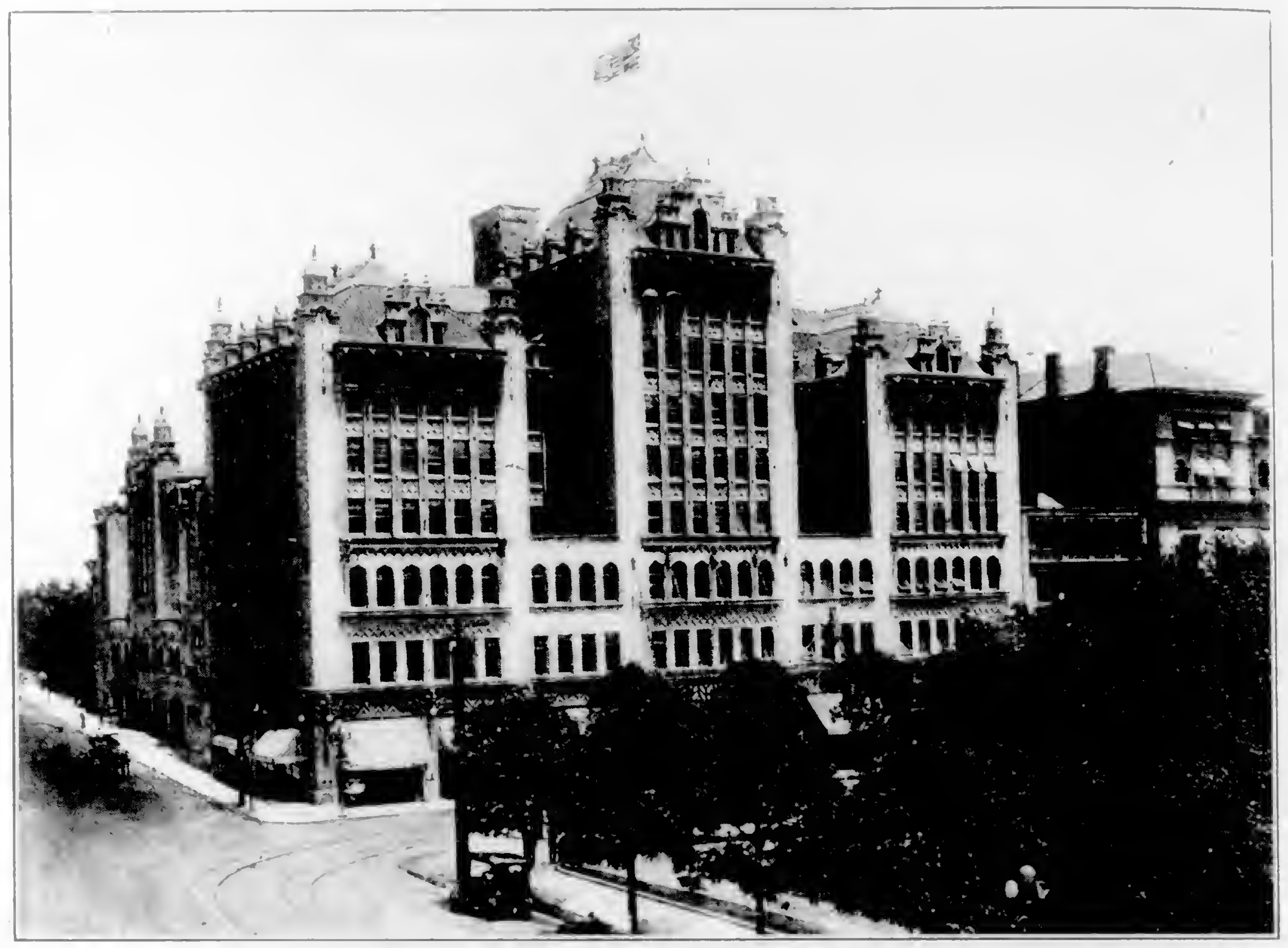
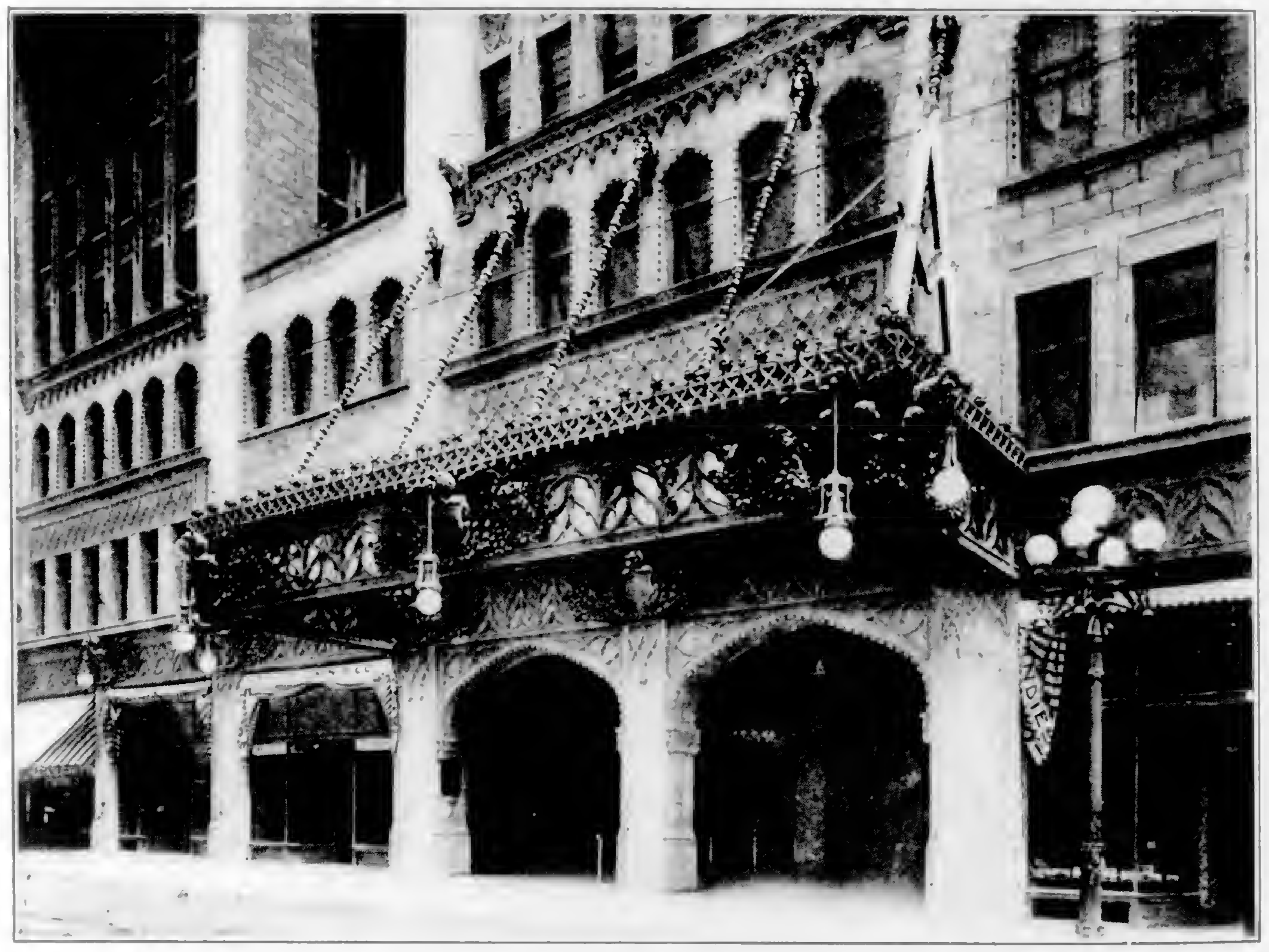
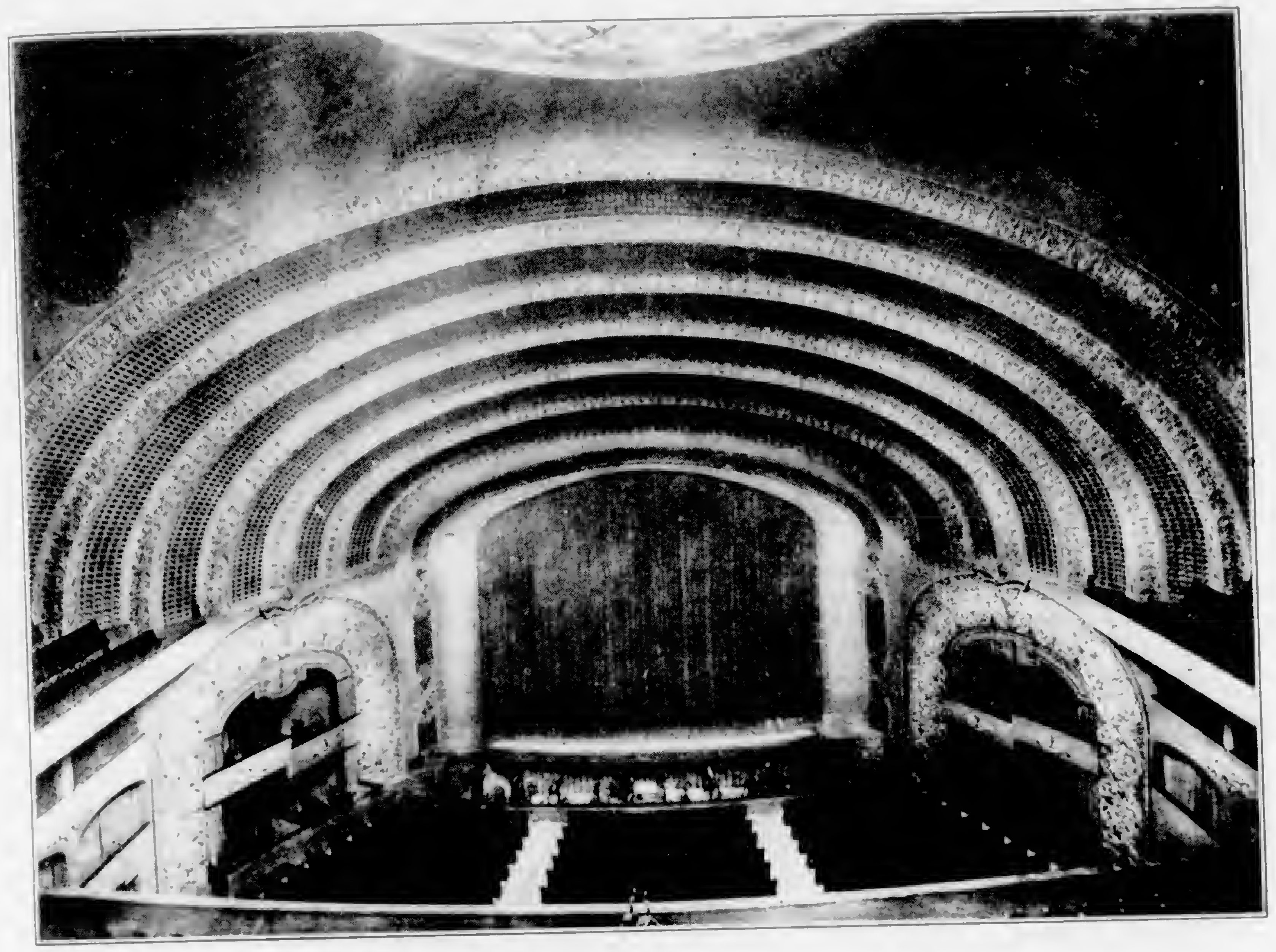


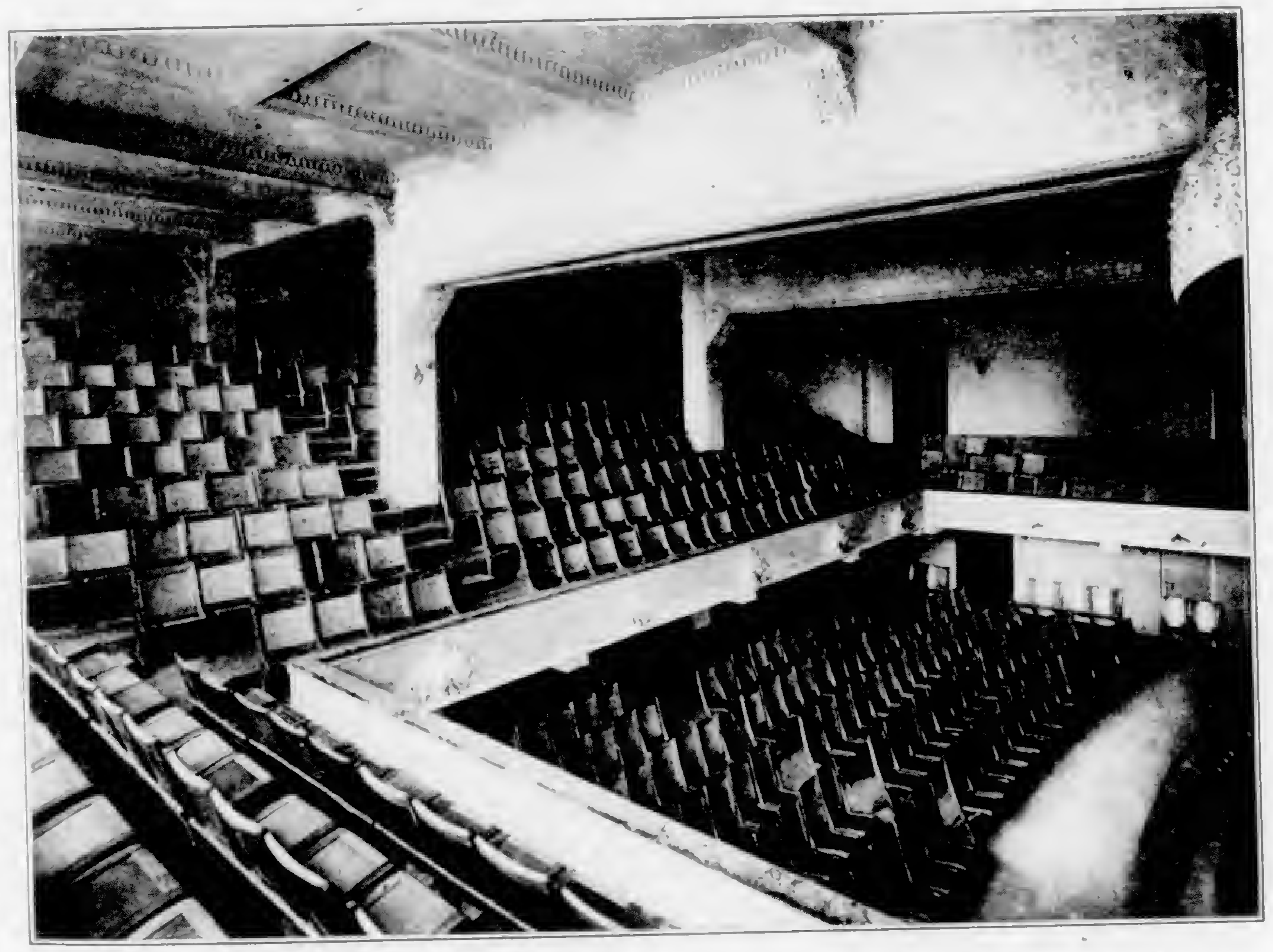
*Auditorium Building, Los Angeles   Chas. F. Whitttlesey, Architect
Equipped with Otis Elevators*



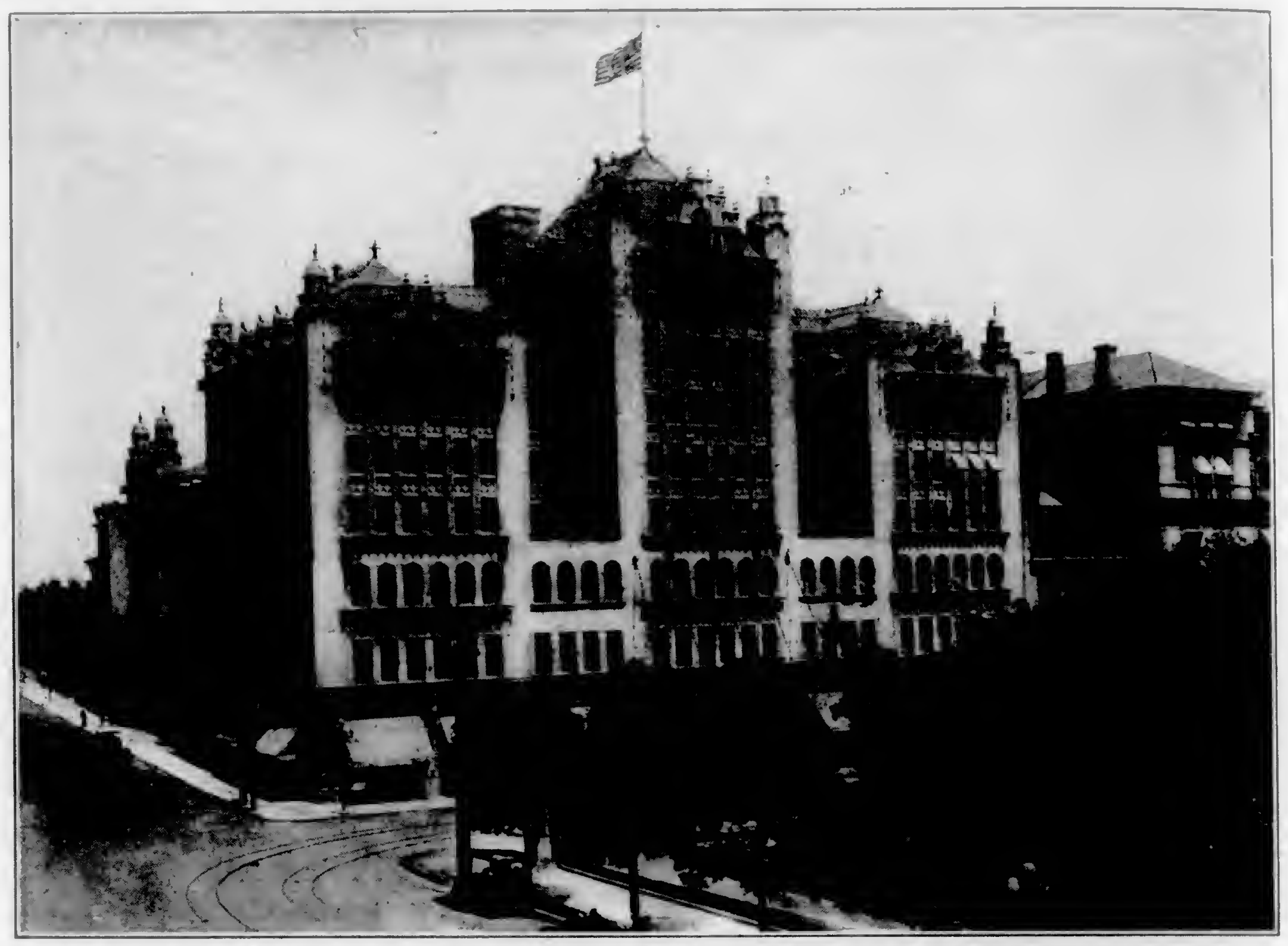
Fifth Street Entrance Auditorium Building, showing Detail of Canopy of Wrought Iron and Verde Antique Bronze Finish



Auditorium Building—Acoustic Dome and Proscenium Arch



Auditorium Building—Choral Hall, Finished in White and Gold with Burnt Orange Hangings



Auditorium Building, Los Angeles Chas. F. Whitttlesey, Architect
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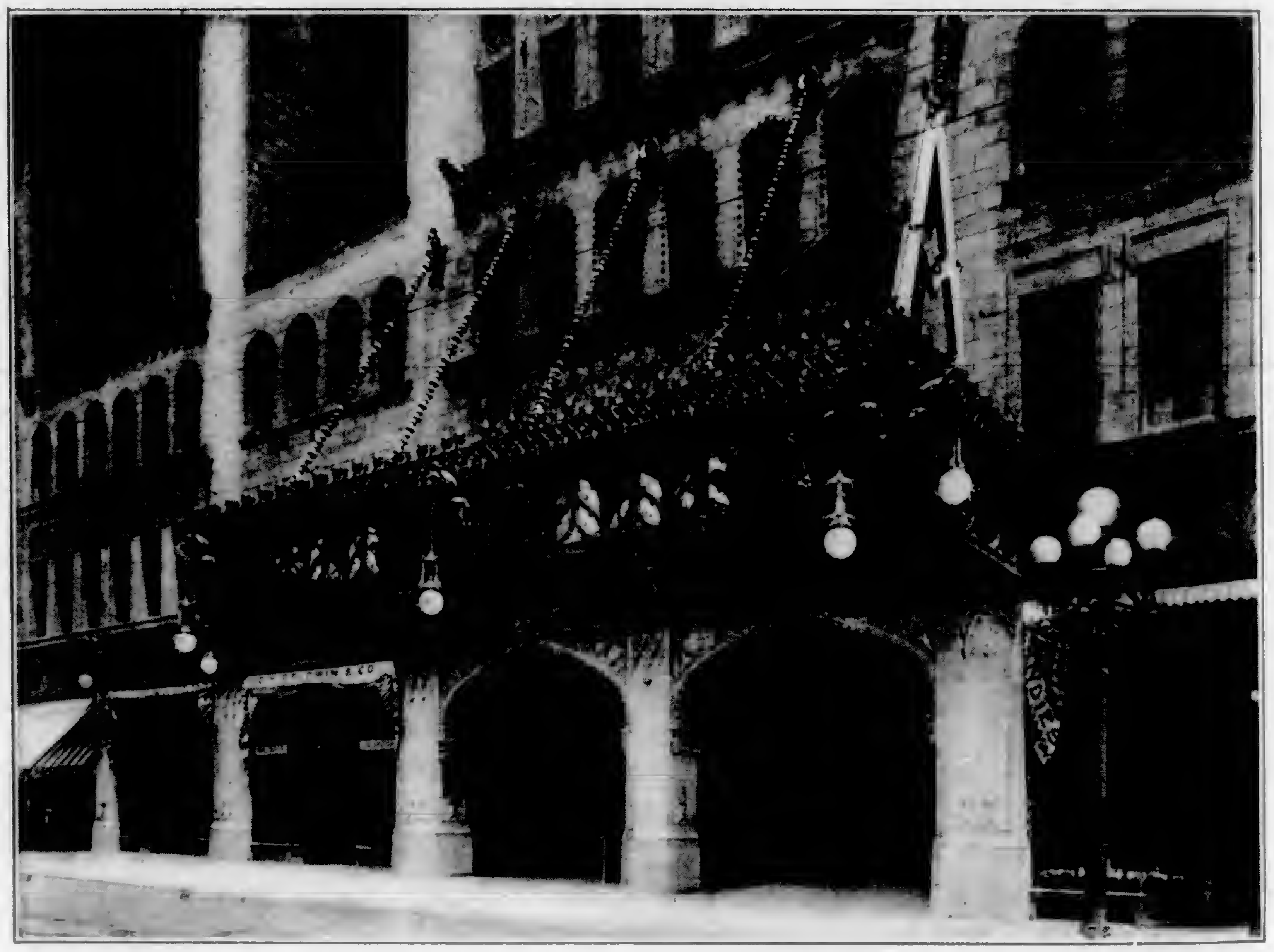

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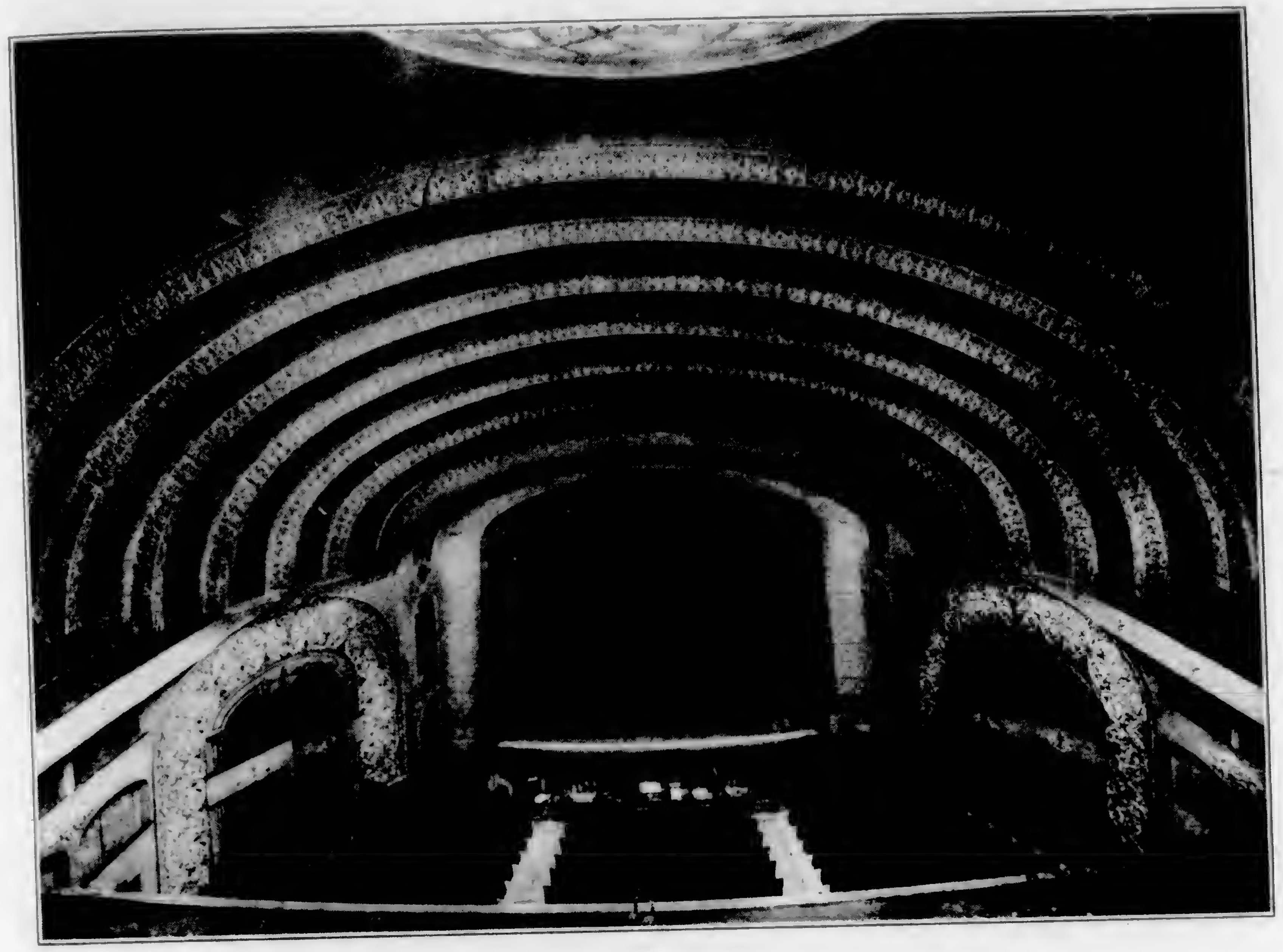

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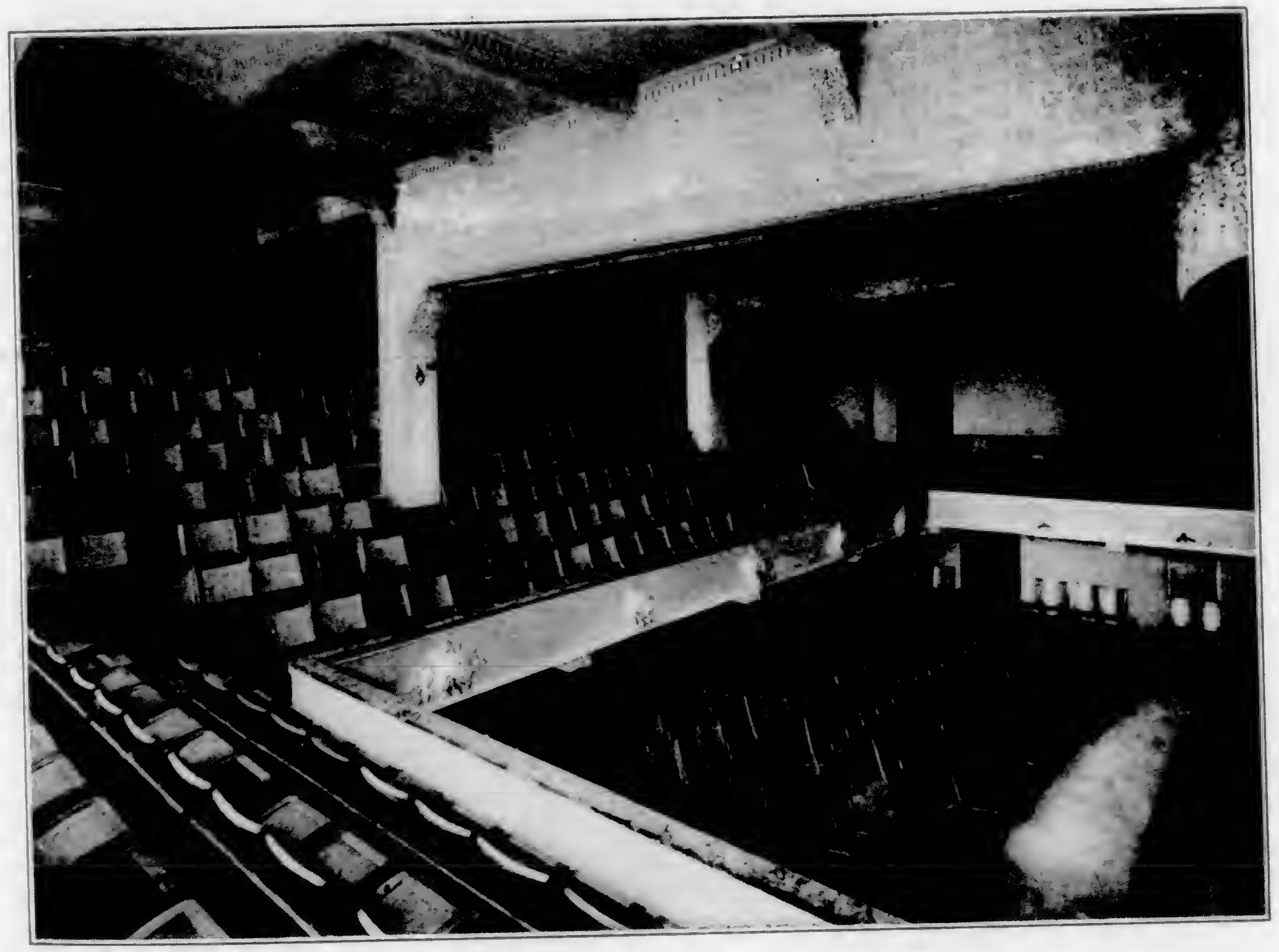

Auditorium Building—Choral Hall, Finished in White and Gold with Burnt Orange Hangings railroad stations and marvels of architectural beauty and aerial grace in bridges, many of which are more than twelve years old. It would seem, therefore, that the experimental stage has been safely passed, and its economy proven and firmly established.

Experiments made by constructors and numerous municipalities, both in Europe and America, to demonstrate the fireproof qualities of reinforced concrete have brought into prominence the very important fact that concrete and steel expand and contract in extreme changes of temperature to practically the same extent in both substances. This fact is of fundamental importance, for no other system of fireproof construction such as steel combined with clay tile has this advantage. A structure of reinforced concrete will withstand a temperature of 2500° Fahr. for many hours or even days without serious damage. Lime kilns in Europe built of reinforced concrete, without firebrick or other inside lining, have endured for several years a temperature of 2200° to 2500° Fahr. An exhibition fire test was made in Belgium in 1899, on a building 15x20 feet, two stories high, built entirely of reinforced concrete, with doors and windows of metal and wire glass. The upper floor was loaded with inflammable goods, to 300 lbs. per sq. ft., being one and one-half times the working load for which it was calculated, which produced a slight deflection. Wood and coal were piled in the lower story, saturated with petroleum, and ignited. It was allowed to burn one hour, producing a temperature of 1300° Fahr. The walls, which were four and three-quarter inches thick, were redhot on the inside, while the hand could be held against the outside without discomfort. The temperature in the second story was raised only four degrees, which would not damage the most perishable merchandise. The upper floor deflected more than one-half inch, but after the fire was extinguished, it recovered completely.

To prove that the floor had not suffered deterioration in the fire, it was again tested 21 days later, with the same load, which produced exactly the same deflection as the first load. The load was then increased to 400 lbs. per sq. ft., or twice the load for which it was designed, which produced a deflection of only one-eighth inch. The lower story was completely filled (and the upper story partly) with fuel, and the roof was loaded with 200 lbs. per ft. The fuel was lighted and burned fiercely for two and one-half hours. The wire glass in windows and doors was melted. The thin walls expanded outward slightly, but showed only fine fissures, with no broken cracks through which hot air could escape. The plam could easily endure contact with the outside surface. The maximum deflection of the second floor was three-quarters inch. After two and one-half hours firing, a stream of cold water was turned onto the inside of walls and ceiling, before the fire was extinguished. An examination the following day showed no injury to the general structure. There was no permanent deflection of floors and the fissures in walls were completely closed. Pyrometer tests during the fire showed 2200° Fahr.

The expansion and contraction of steel and concrete are practically identical, therefore in high temperature the adhesion between the two materials is not destroyed and the latent forces of the structural members are not set up in opposition to their working forces. In other words, the steel and concrete are not subjected to additional stress when superheated. The question is often asked, why is tile, burned under great heat, not a fireproof material? The reason is that tile and all clay products expand under extreme heat more than twice as much as steel, therefore partitions and floor arches to hollow tile in a conflagration, expand more than the steel frame and tie rods that sustain and confine them will admit of, and consequently the tile buckles, bursts and flies off. One side of a tile partition or floor arch

Auditorium Building—Great Promenade Foyer

Auditorium Building—Main Foyer

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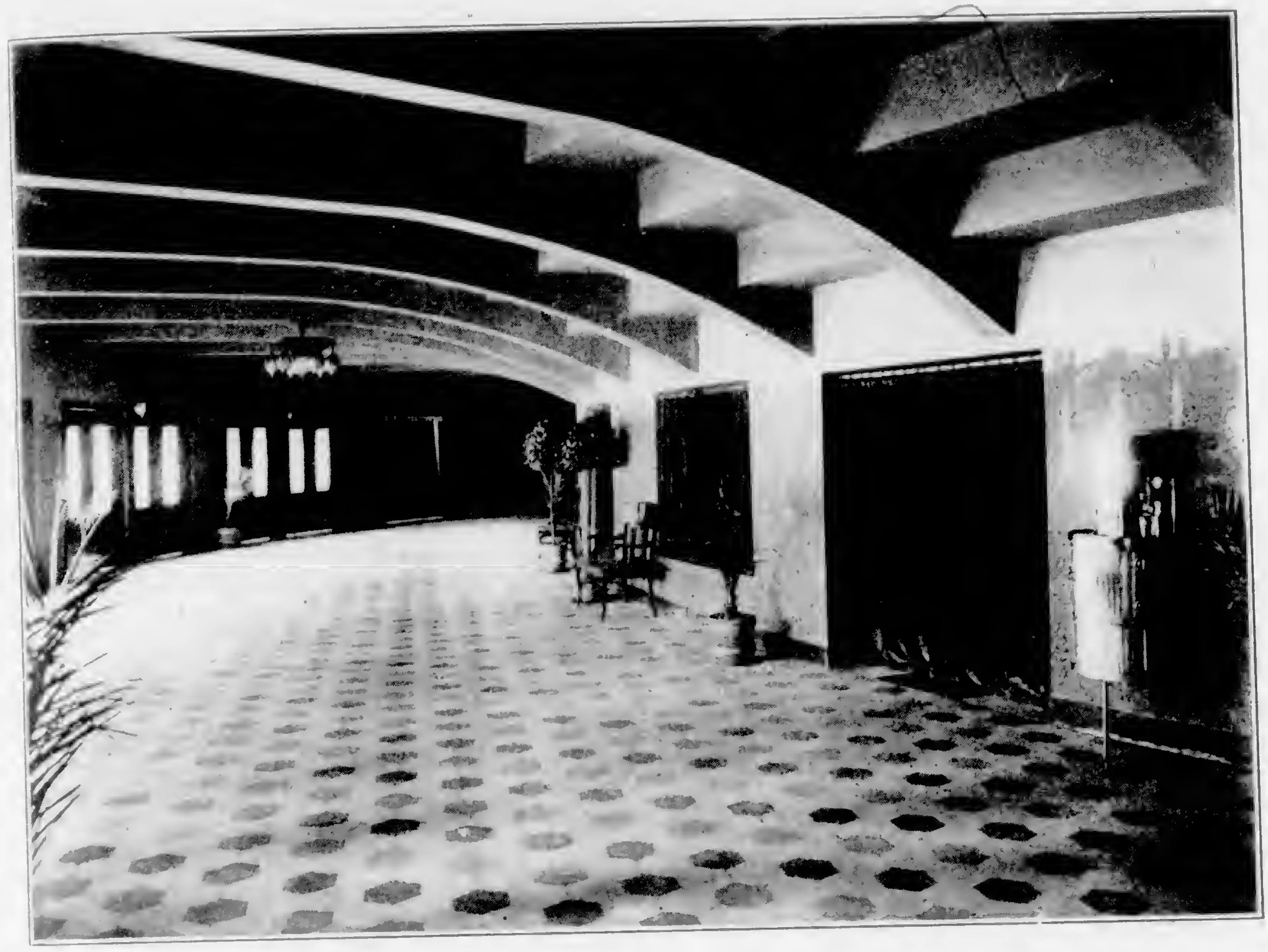
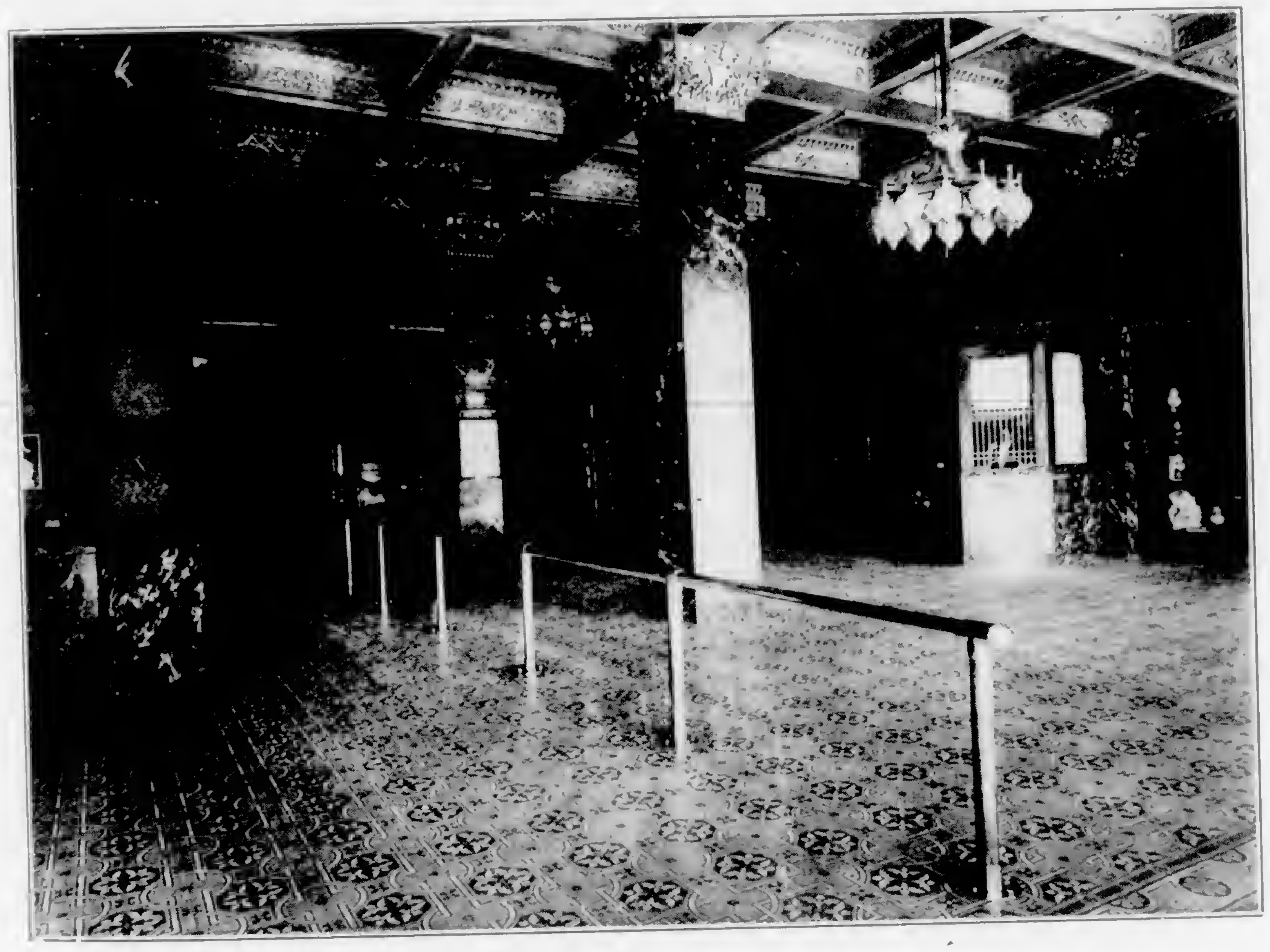
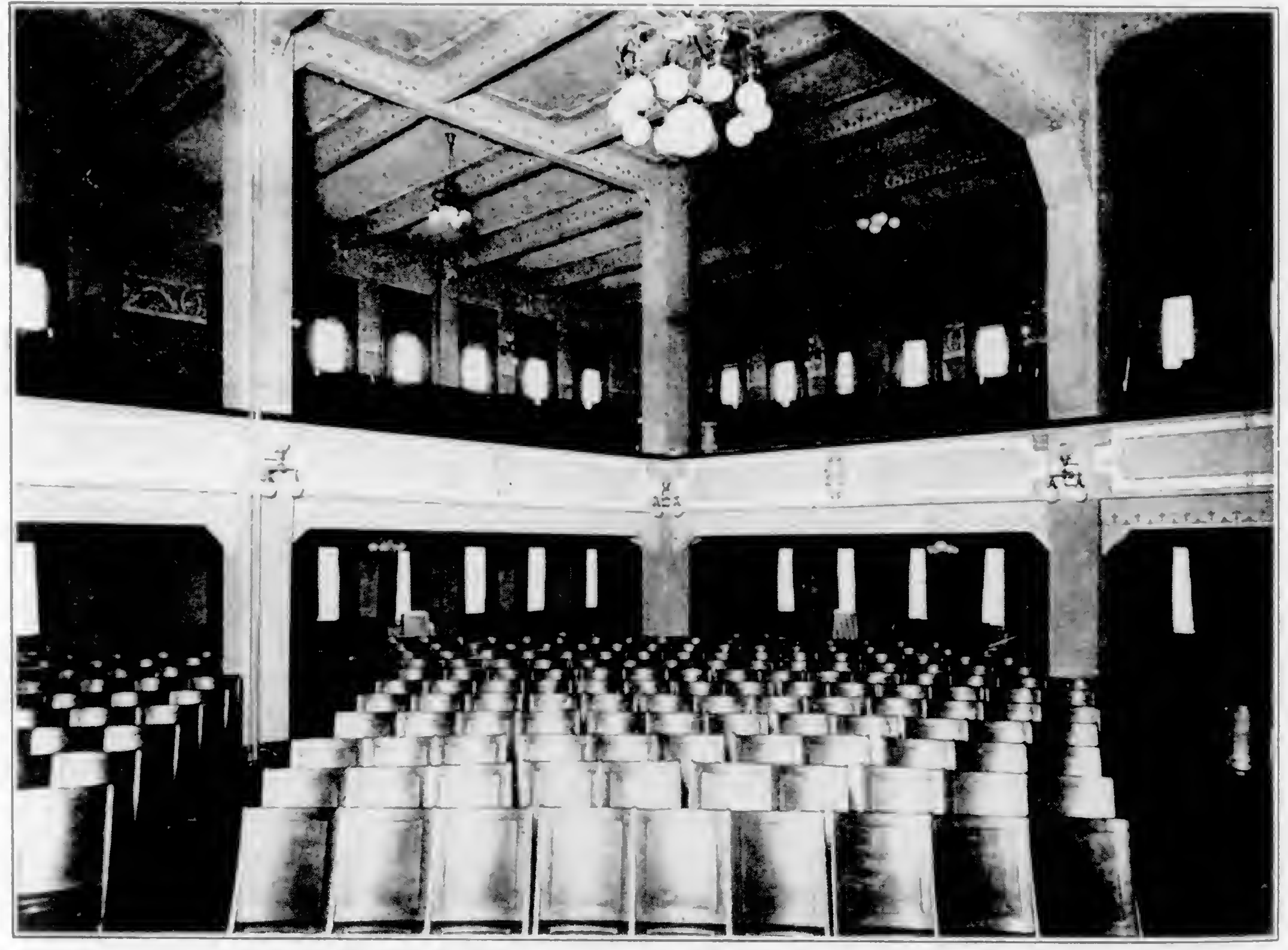


Auditorium Building—Great Promenade Foyer



Auditorium Building—Main Foyer

Auditorium Building—Interior of Main Auditorium



Auditorium Building—Berean Hall

becomes heated while the other side is comparatively cool (for these tile are excellent non-conductors) and expands and bursts off. The same is true of beam and column coverings. In a building subjected to fire, which has been erected of concrete composed of Portland cement, silicate sand and crushed granite, one would naturally suppose that there would be disintegration of the granite, such as occurs in a solid granite column under the action of fire. Such, however, is not the case. The reports of the Fire Underwriters tests show that a temperature of 1000 or 1500° Fahr. dehydrates the surface of such concrete to a slight depth, which makes of this outer surface a splendid non-conductor, through which great heat penetrates slowly and being absorbed by the mass of concrete behind the surface, the dehydrating process proceeds very slowly and in one of the concrete buildings in the fiercest part of the Baltimore fire, the dehydration penetrated only one-quarter inch, leaving the structural members practically unimpaired. This building, by the way, was inclosed by brick walls which were totally destroyed, leaving the concrete floor slabs suspended, and supported by the concrete interior columns. Part of the brick from the crumbling walls fell upon the floor slabs with no effect except to break off the edges.

I have made numerous tests on concrete blocks, by repeatedly heating to redness and plunging in water, which confirms the above assertion, though similar tests have been made in this city, in which the blocks are said to have completely disintegrated. I am satisfied in my own mind, that the samples were first saturated in muriatic acid, which caused the disintegration.

The definition of an Engineer is, one who utilizes the resources of Nature with the least employment of human labor to produce results. Since the beginning of Man's work, skilled labor has been growing more costly, because the laborer has learned to demand more of the luxury and comforts of life. The experience of all older countries is, that as population increases in density, common labor becomes cheaper in proportion to skilled labor.

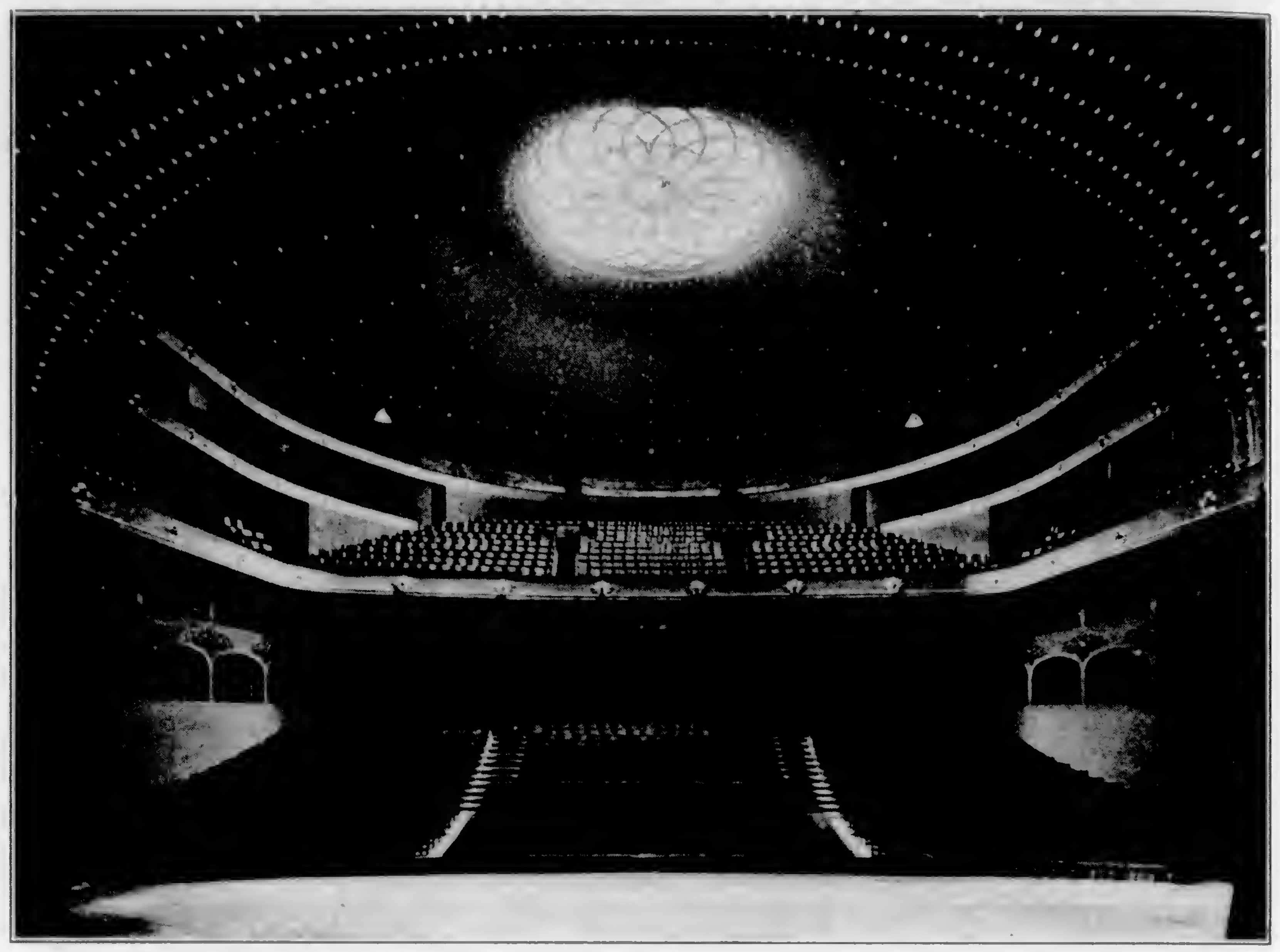
Reinforced concrete construction employs a greater proportion of unskilled labor than any other system.

From my own experience in this kind of construction, I am convinced that for factory and warehouse purposes, reinforced concrete fireproof construction in California is not at present more than 5 per cent greater than Class C construction, having brick walls and wooden floors. For hotels and office buildings the concrete construction, absolutely fireproof, is at least 20 per cent less expensive than the same building would be if constructed of steel and tile, and not more than 10 per cent greater than Class C construction. These facts taken in consideration with its great rigidity and durability, are certain to make reinforced concrete very popular and elevate the general standard of our city buildings, besides reducing greatly the cost of insurance.

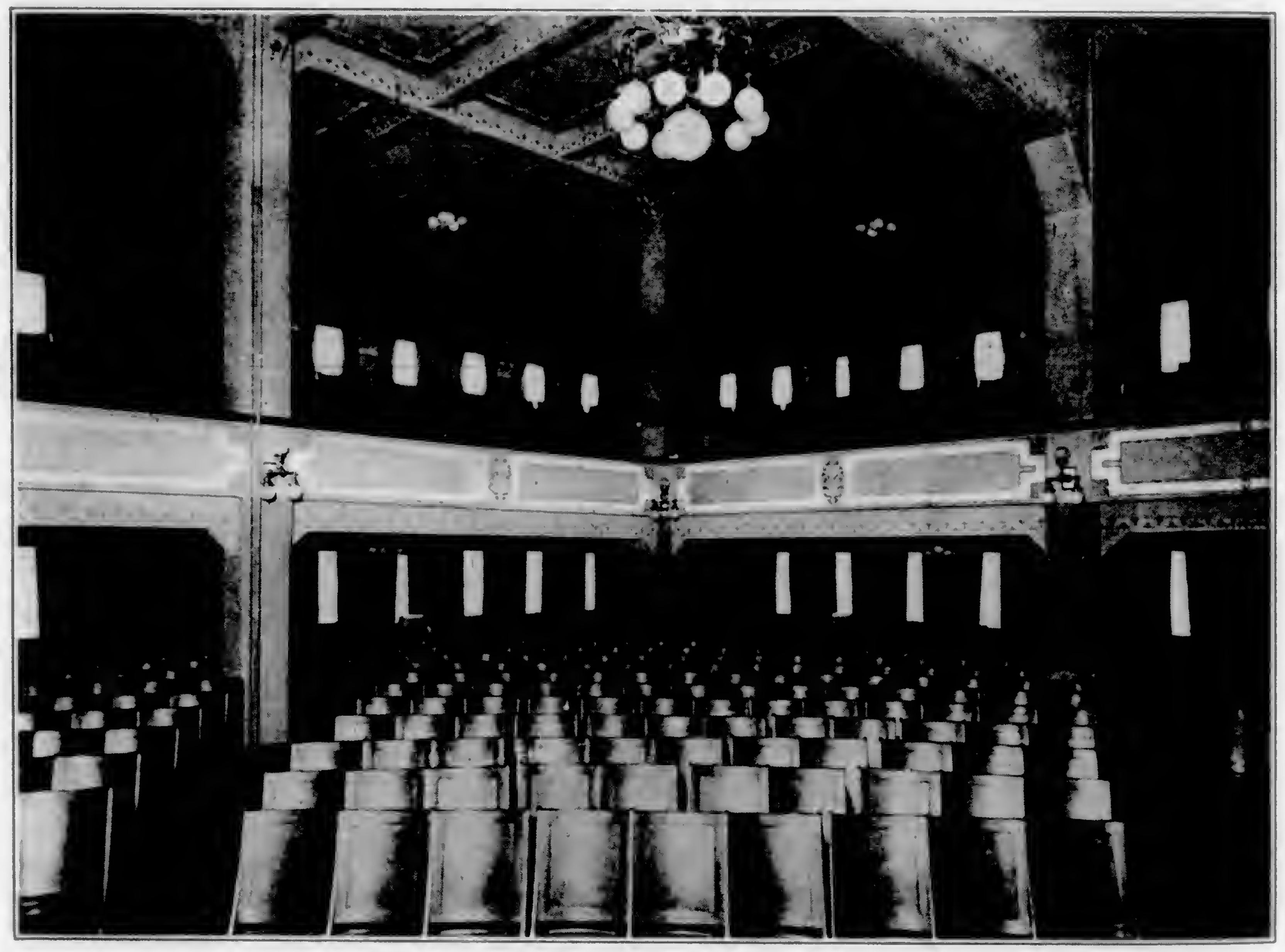
We have excellent sand and crushed rock in California, and within a very few years we will have Portland cement of the highest quality selling in this market for less than one-half of its present price. I feel confident that in ten years, reinforced concrete will be the universal building material for all kinds of structures from the cottage to the State capitol.

Rapidity of construction, especially in a business building of any magnitude, means dollars saved to the Owner, for speedy completion brings quick returns on the capital invested in the ground and building.

The casual observer of buildings under construction, would probably conclude that steel buildings can be erected more rapidly than concrete structures. This is true only in the actual erection of the frame. He has perhaps failed to notice that in the case of the steel building, the work has been suspended a long time after the foundations are in, before the steel work is



Auditorium Building—Interior of Main Auditorium



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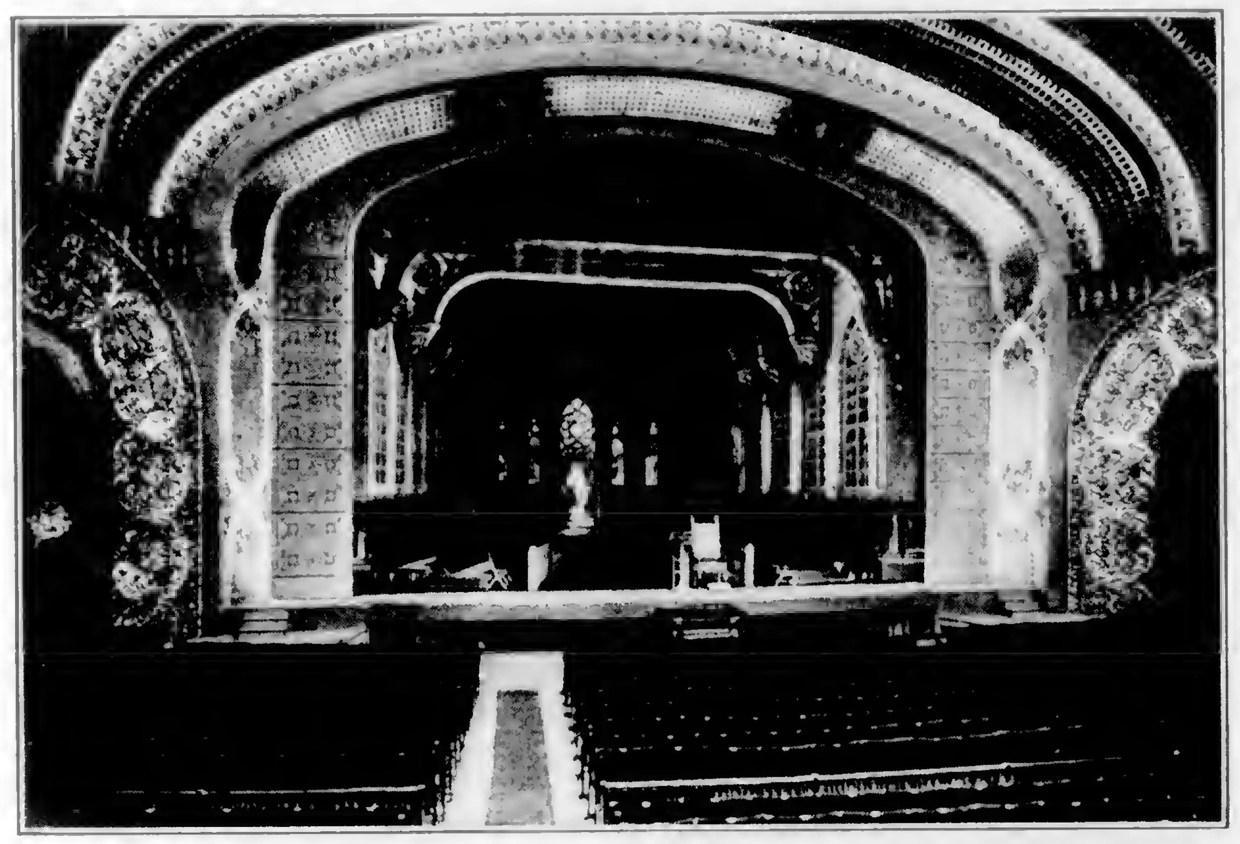
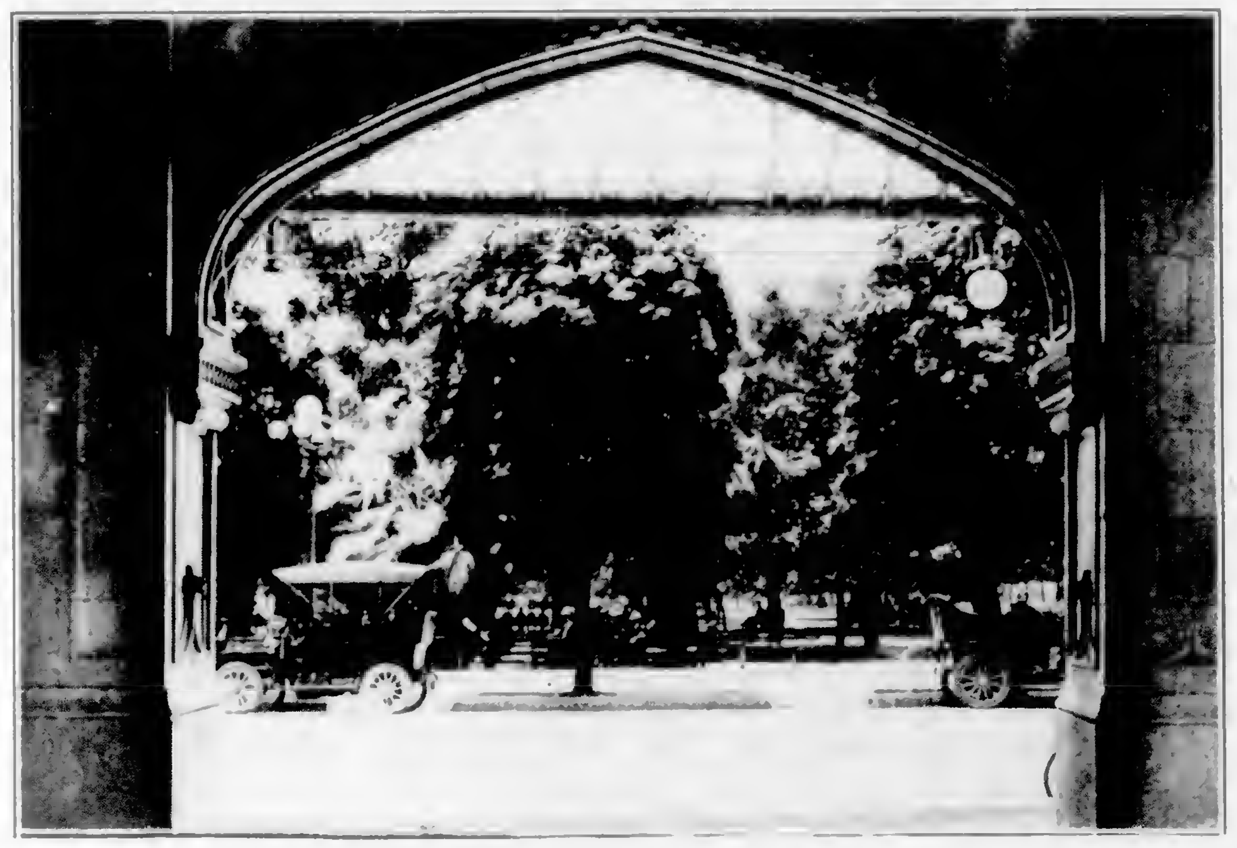


AUDITORIUM BUILDING

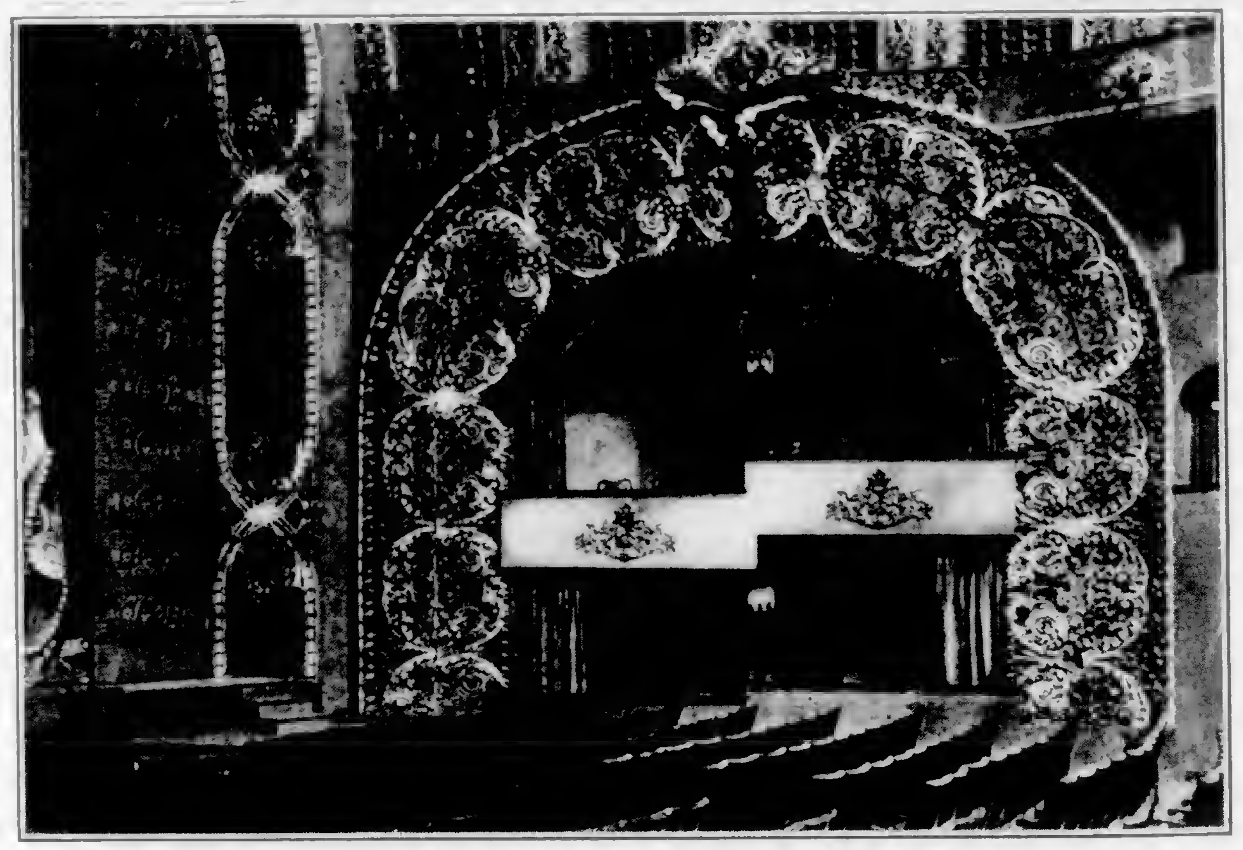
The Stage

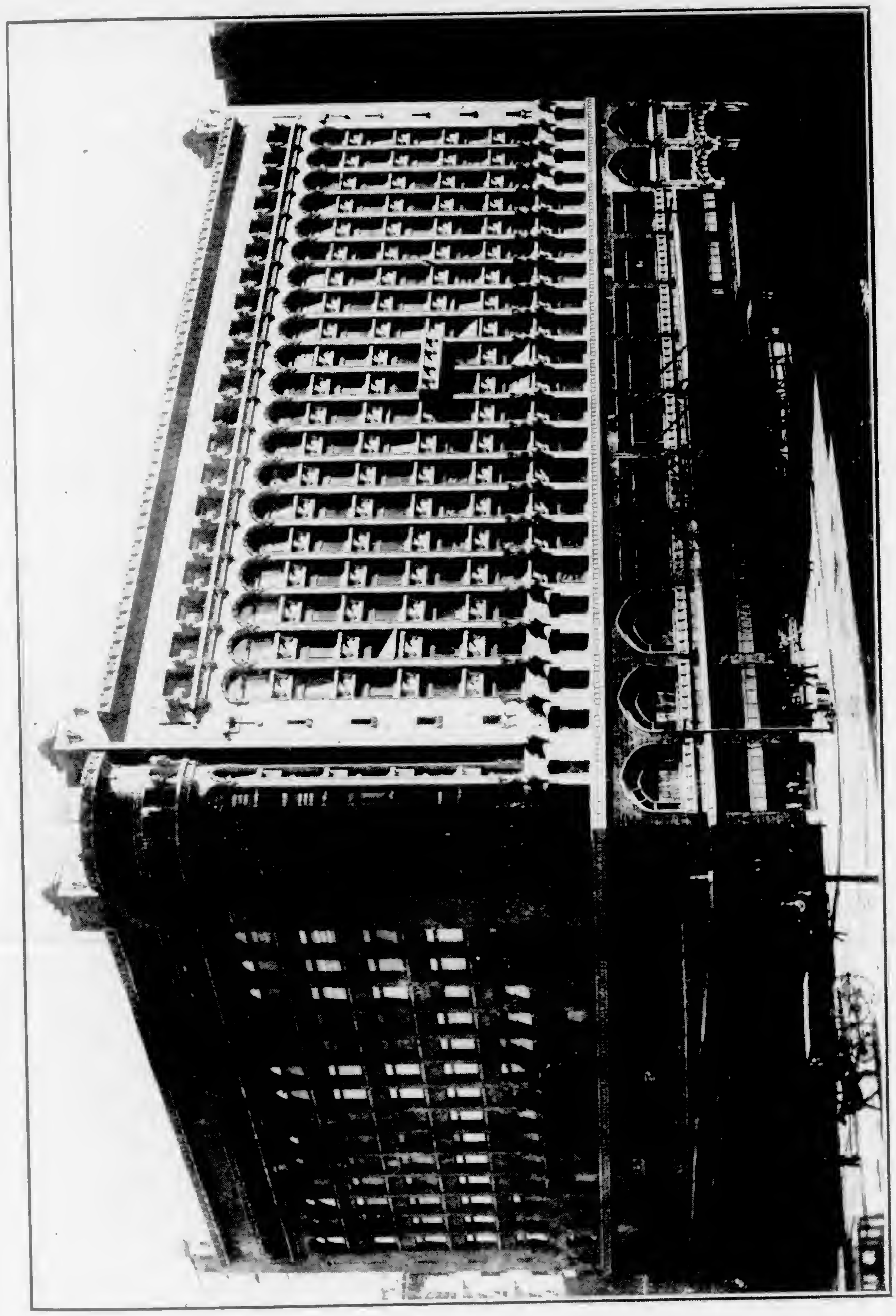


Auditorium Building — View of Park Through Grand Entrance

AUDITORIUM BUILDING

Proscenium Boxes

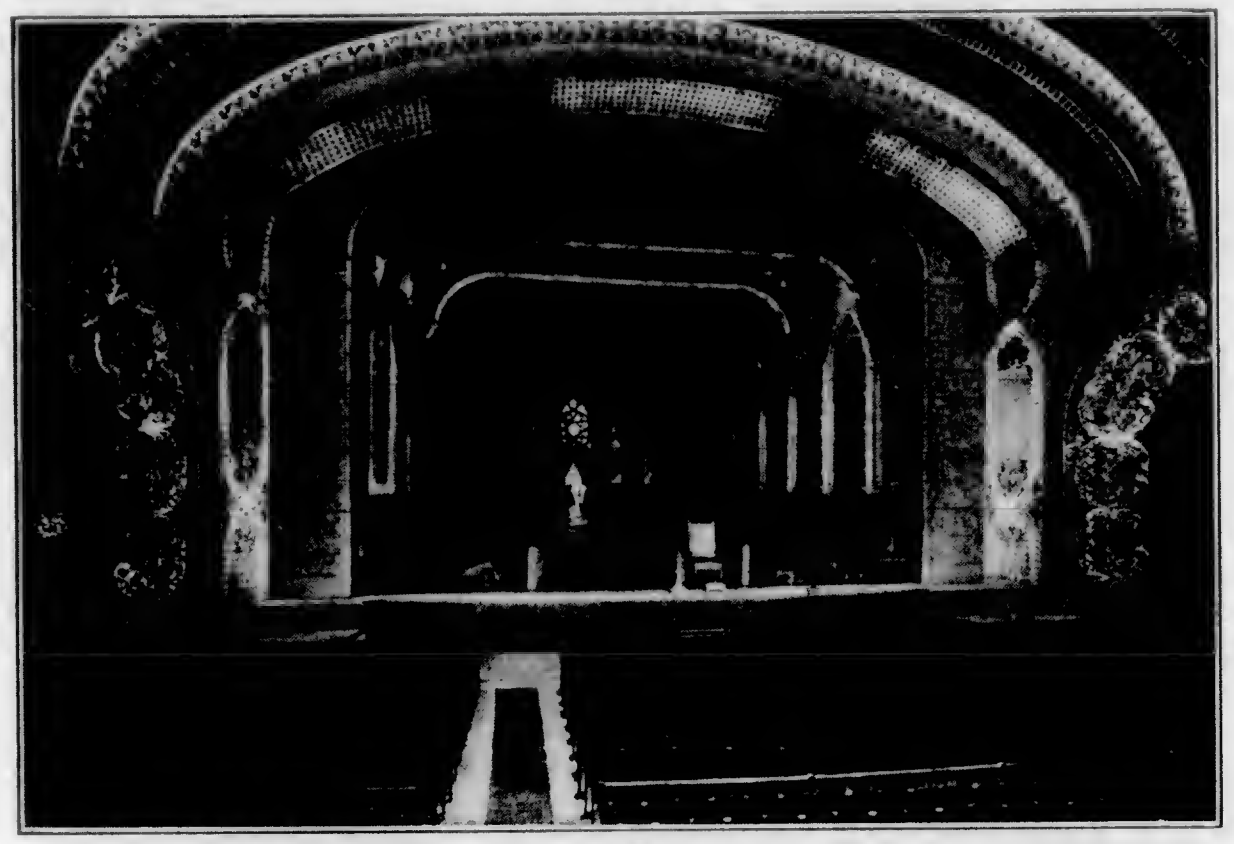




Pacific Building, San Francisco

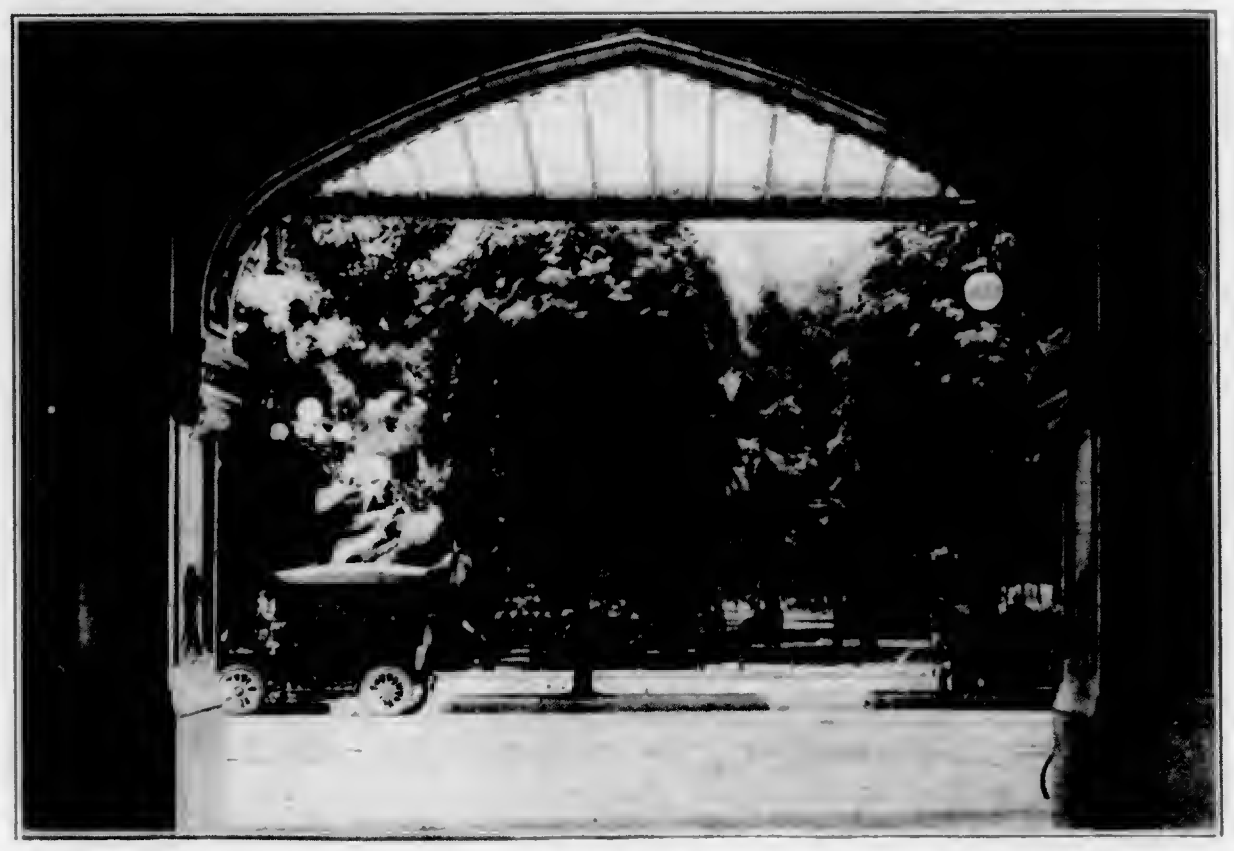
Chas. F. Whittlesey, Architect
Cabinet Work and Store Fittings by L. and E. Emanuel

Equipped with Otis Elevators

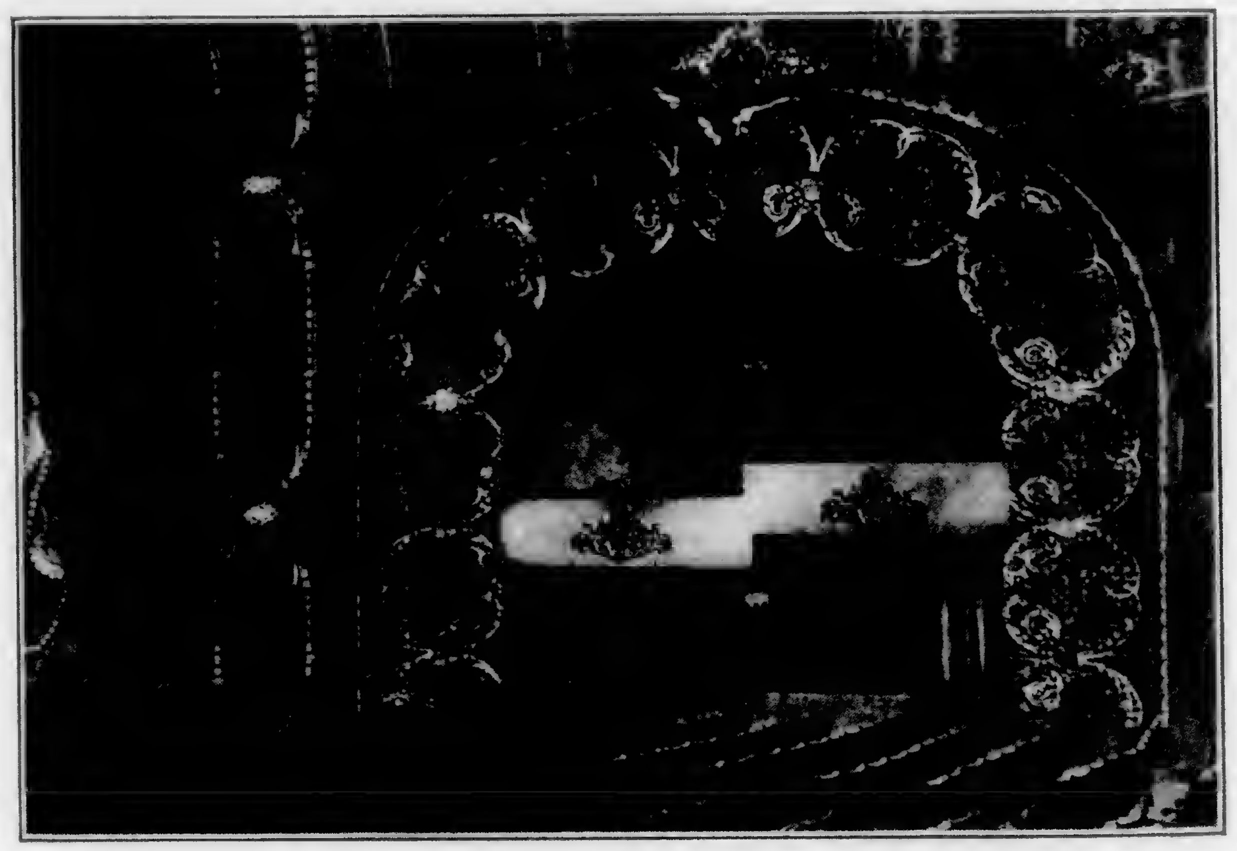


AUDITORIUM
BUILDING

The Stage



Auditorium Building—View of Park Through Grand Entrance



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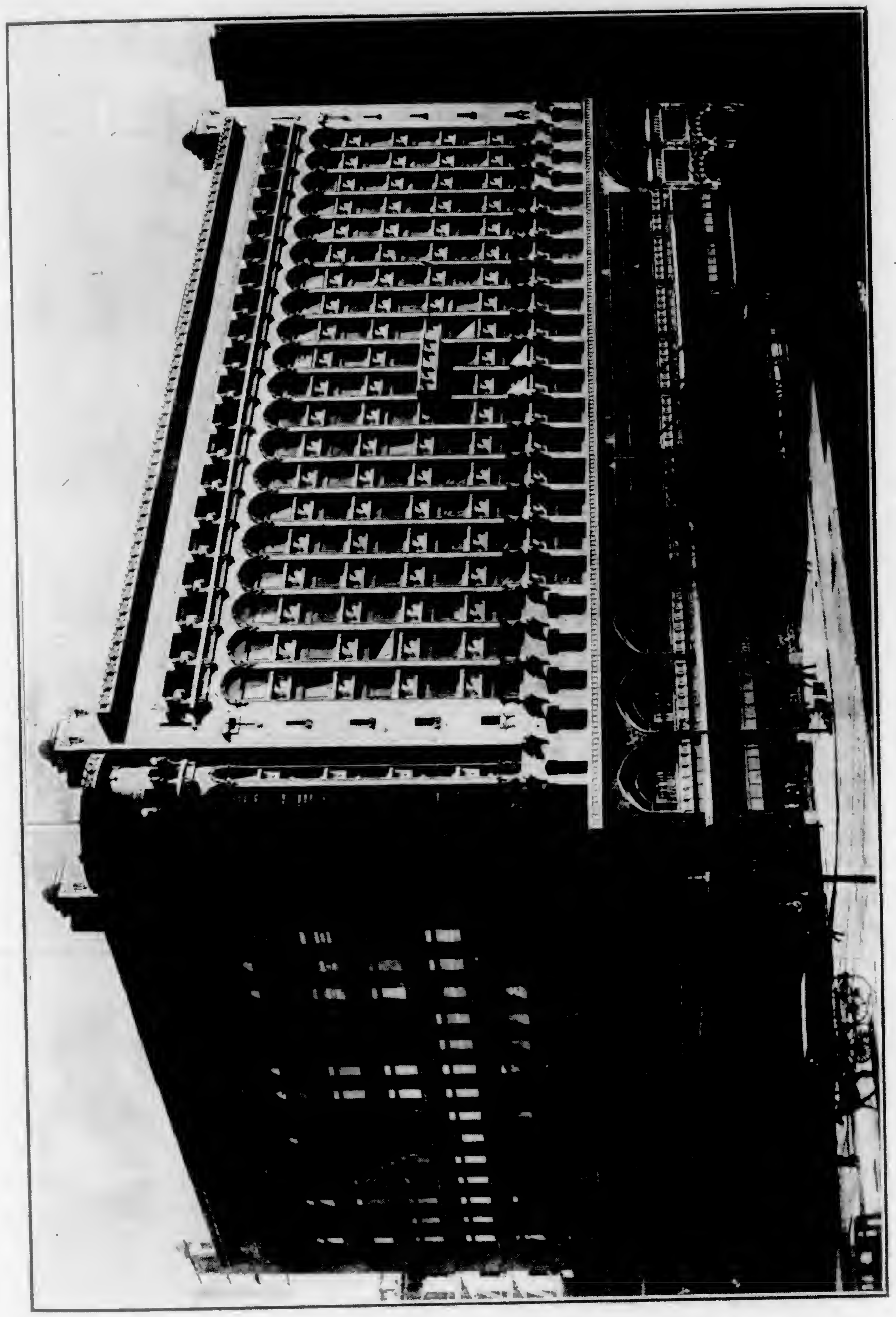

Equipped with Otis Elevators

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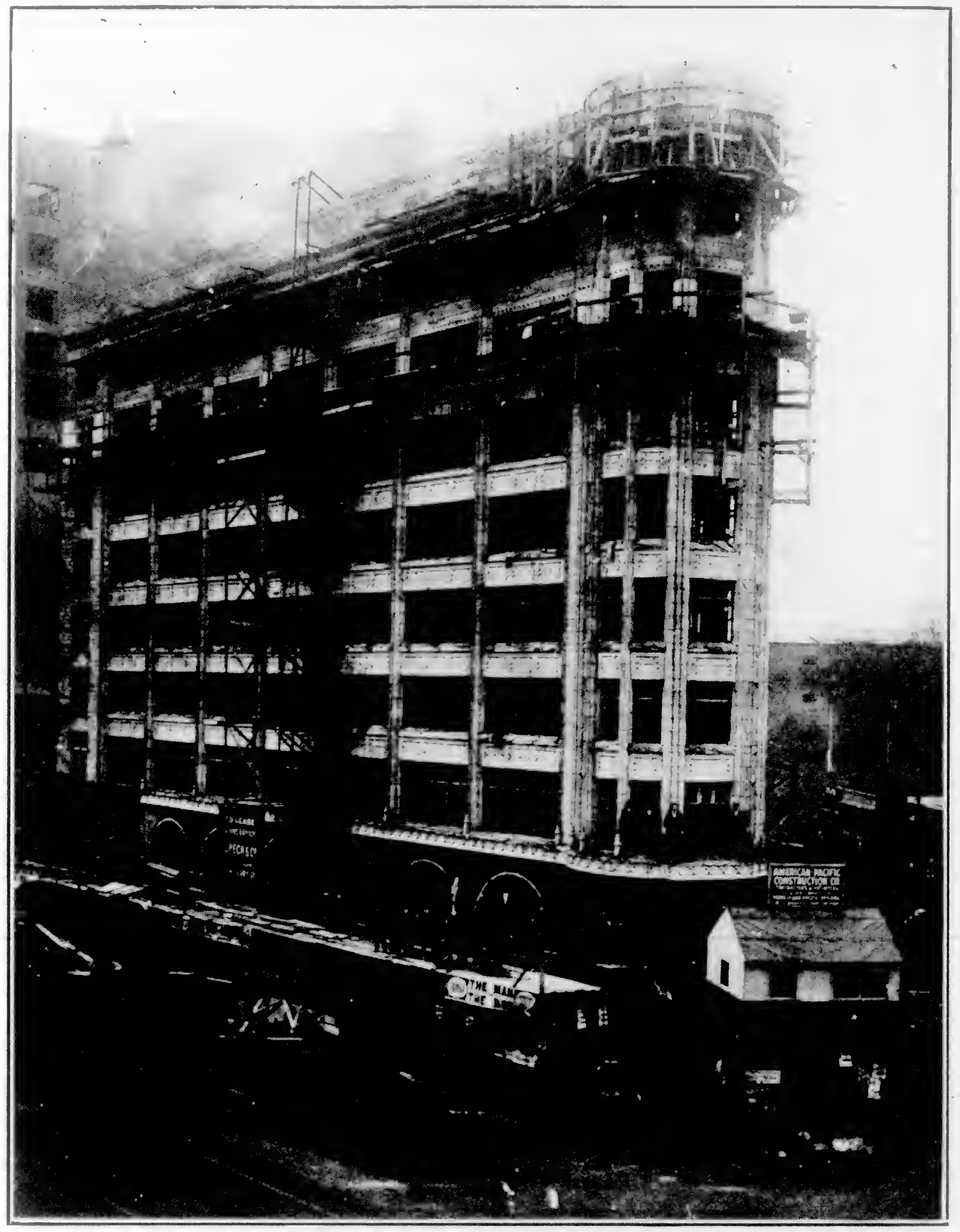


West Bank Building, San Francisco
Equipped with Otis Elevators *Chas. F. Whittlesey, Architect*

begun, and that in the case of the concrete building the structure rises as soon as the excavation is completed, without any cessation of the work.

The difference is this. For the steel building, after the preliminary sketches are approved by the Owner, several weeks or months are required to produce careful working drawings and framing plans, with all dimensions of every member in exact figures, before the steel can be ordered. After these are prepared, it requires from 5 to 7 months time to get delivery of the steel. When the steel is delivered, the skeleton frame goes up; and the public is impressed with its rapid climb skyward, not taking into consideration that the fireproofing of the columns and girders and the tile floor arches must all be placed, the ceilings lathed and plumbing pipes and wire conduits installed before it is in fair comparison with reinforced concrete. On the other hand, when the Owner has approved the preliminary sketches for a concrete building, the steel rods forming the sinews of the structure can be ordered at once, without waiting for the completion of working drawings, and can be delivered in California from Pueblo or the Pittsburg mills in five weeks after the order is placed. It goes directly to the building from the cars, requiring no shop work, and is all placed in position by common labor. As the structure rises, it is complete, ready for plastering, with all plumbing and heating pipes and electric conduits in place.

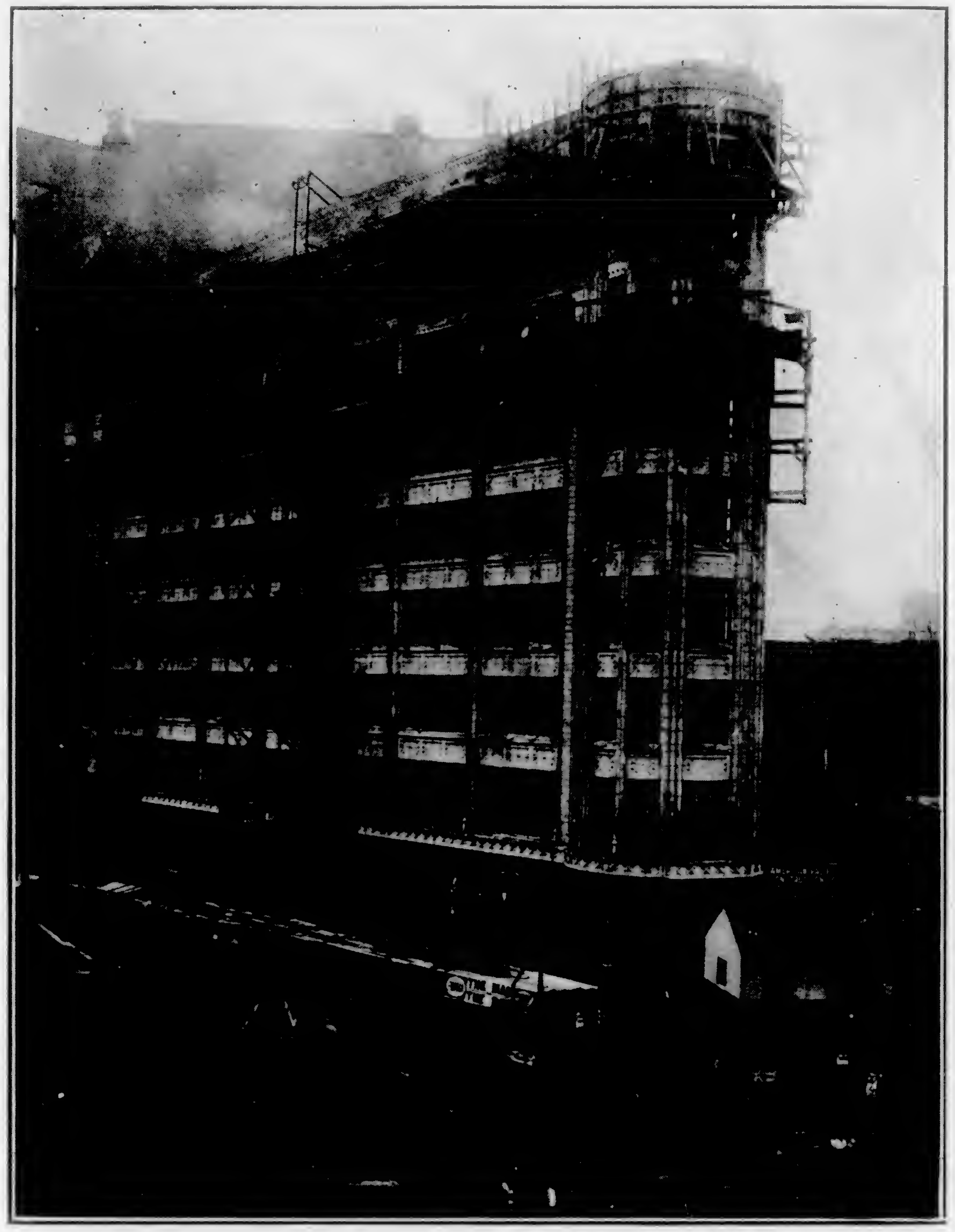
Each concrete floor slab forms a good roof so that the finishing of the lower stories may be completed, and occupied, while the structural part of the upper stories is being erected.

In the argument for durability, reinforced concrete is in a class by itself. As far as the elements are concerned, it is practically indestructible. It is by far the most rigid and freest from vibration of any construction known. The steel sinews forming the reinforcement, give to the concrete sufficient elasticity to withstand admirably the strains produced by earthquakes, and with the ample bracket connections between columns and floor beams, which this method supplies, it would require a greater shock than California has experienced since the coming of the Padres, to produce in it any sign of failure. Even though it were strained to the extent of producing cracks, the strength of the structure would be but little impaired, because of the reinforcing metal.

The inherent faults, almost impossible to overcome in the steel skeleton construction, are corrosion and crystalization due to vibration. The former may be retarded by painting, but to overcome this objection and remedy the faults of tile, concrete has lately come into vogue as a fireproofing for metal columns and beams. It is extremely difficult, however, to get a complete covering of the metal in all parts, and the result is that it is seldom well executed.

When steel first came into general use for structural work, there were many engineers who earnestly and honestly contended that it was not suitable for the purpose, because of these inherent faults.

These questions have not yet been satisfactorily settled, and some of the most eminent engineers in the world today, predict dire calamities for our high steel structure at no distant date, and the life of these buildings is not now considered as long as formerly supposed. The life of a steel railroad bridge is hardly long enough to warrant its cost and carries a high expense for maintenance. The life of the most fibrous railroad car axle is seven years, after which it is dangerously crystallized. The same effect from the same cause has already been discovered in the lower story columns of the earlier steel sky-scrapers, and it has been necessary to replace them with new ones at great expense. The designers of these buildings realize that their factor of safety has proven to be very close to the danger line. Recently one of the tall steel buildings in Chicago has been condemned as unsafe structurally.



West Bank Building, San Francisco
Equipped with Otis Elevators *Chas. F. Whittlesey, Architect*

begun, and that in the case of the concrete building the structure rises as soon as the excavation is completed, without any cessation of the work.

The difference is this. For the steel building, after the preliminary sketches are approved by the Owner, several weeks or months are required to produce careful working drawings and framing plans, with all dimensions of every member in exact figures, before the steel can be ordered. After these are prepared, it requires from 5 to 7 months time to get delivery of the steel. When the steel is delivered, the skeleton frame goes up; and the public is impressed with its rapid climb skyward, not taking into consideration that the fireproofing of the columns and girders and the tile floor arches must all be placed, the ceilings lathed and plumbing pipes and wire conduits installed before it is in fair comparison with reinforced concrete. On the other hand, when the Owner has approved the preliminary sketches for a concrete building, the steel rods forming the sinews of the structure can be ordered at once, without waiting for the completion of working drawings, and can be delivered in California from Pueblo or the Pittsburg mills in five weeks after the order is placed. It goes directly to the building from the cars, requiring no shop work, and is all placed in position by common labor. As the structure rises, it is complete, ready for plastering, with all plumbing and heating pipes and electric conduits in place.

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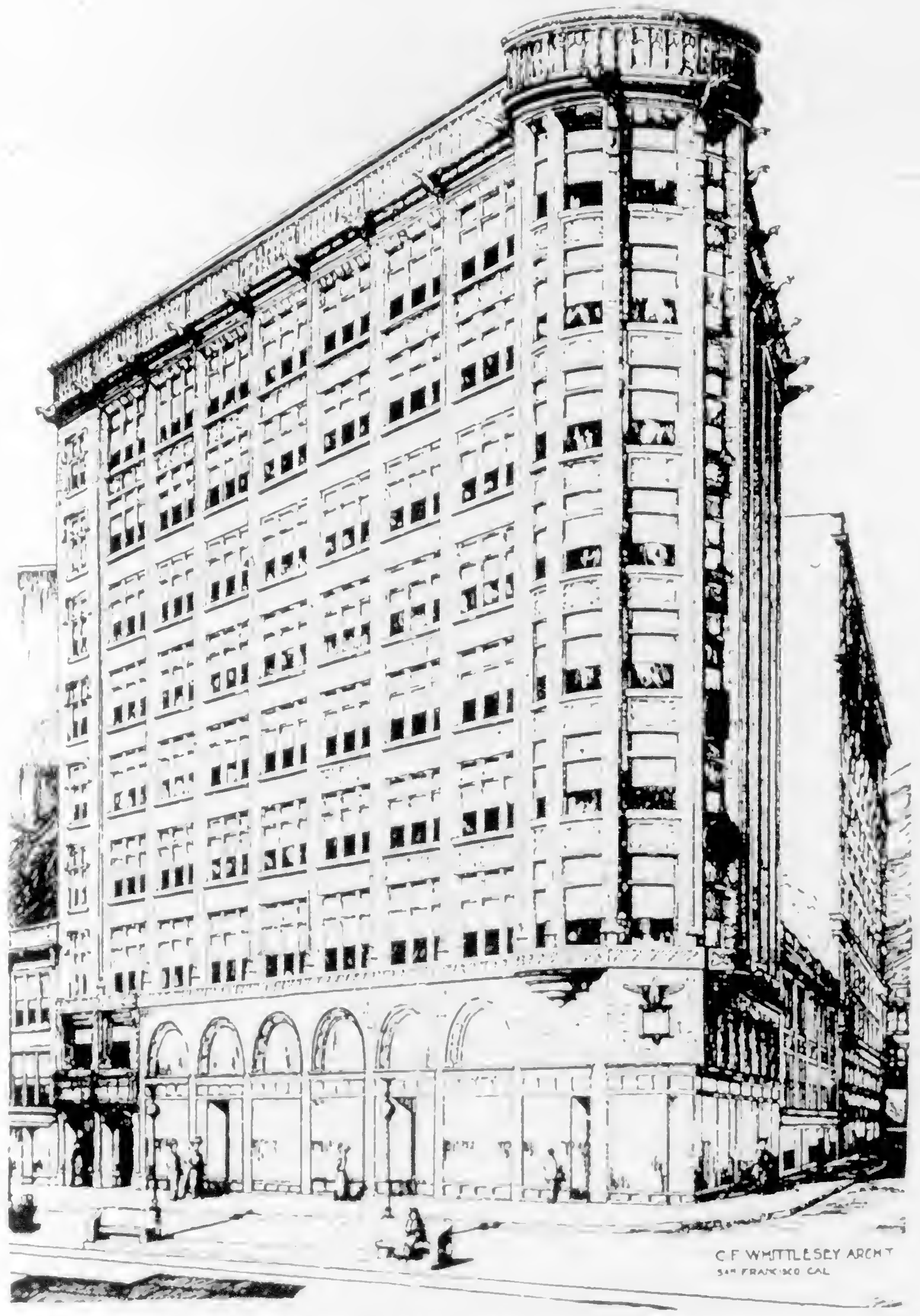
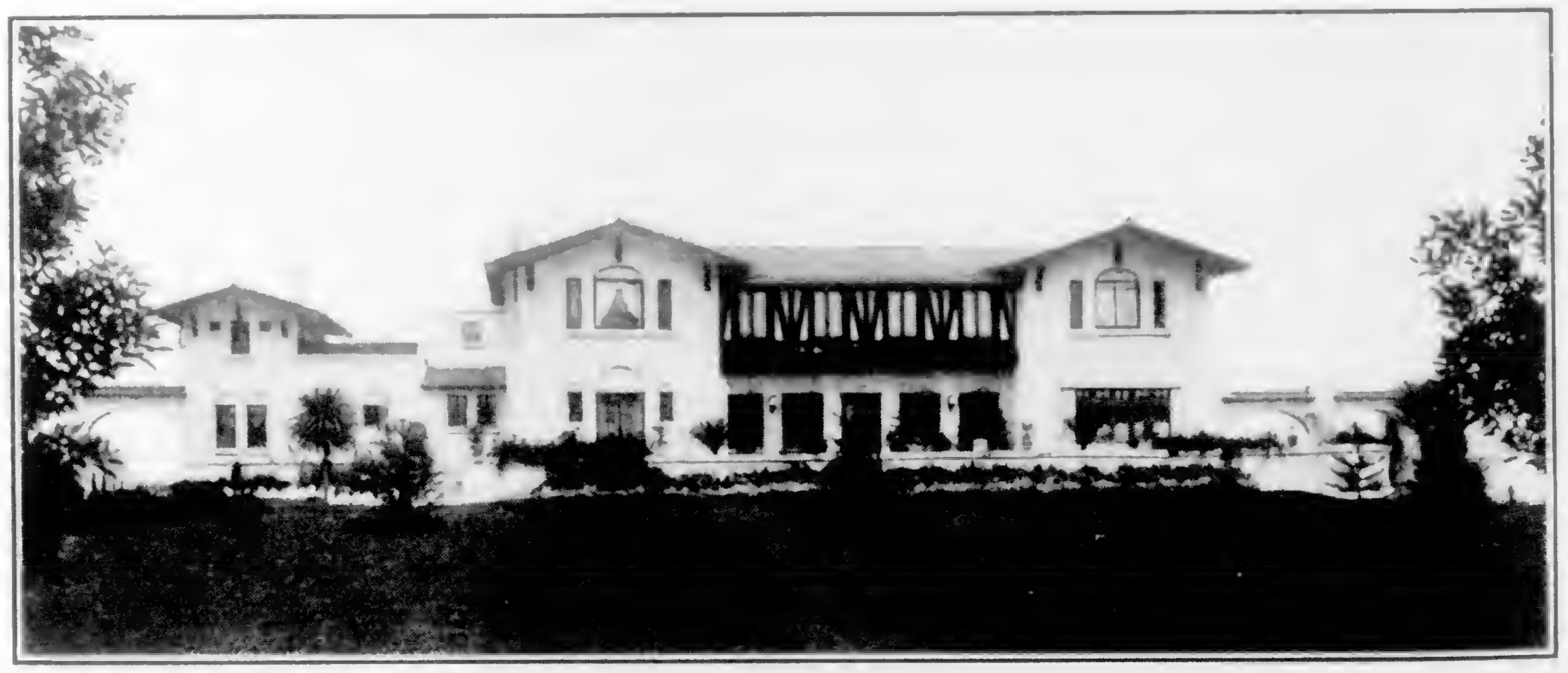
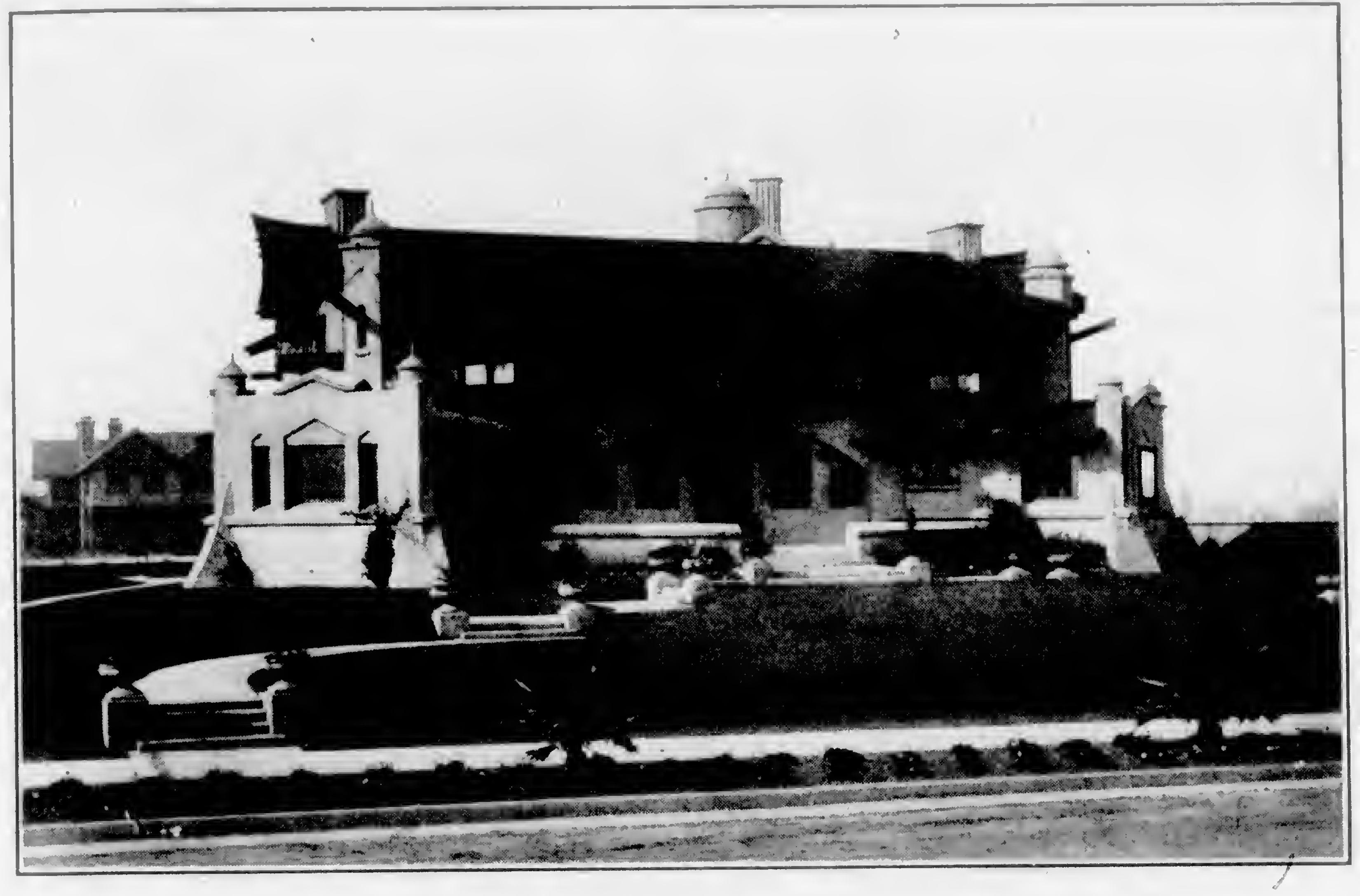


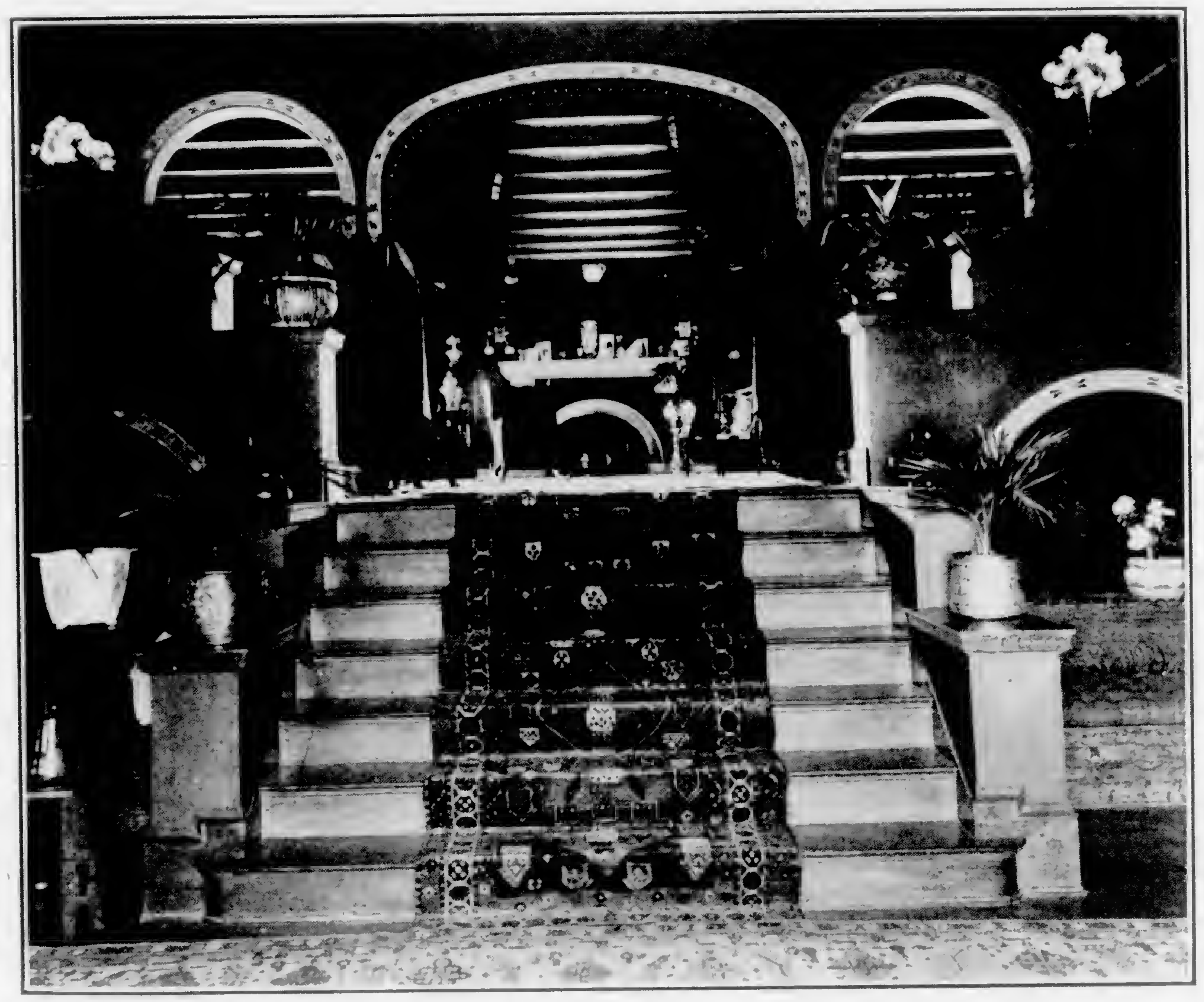
Pen and Ink Drawing of West Bank Building, San Francisco
Chas. F. Whittlesey, Architect



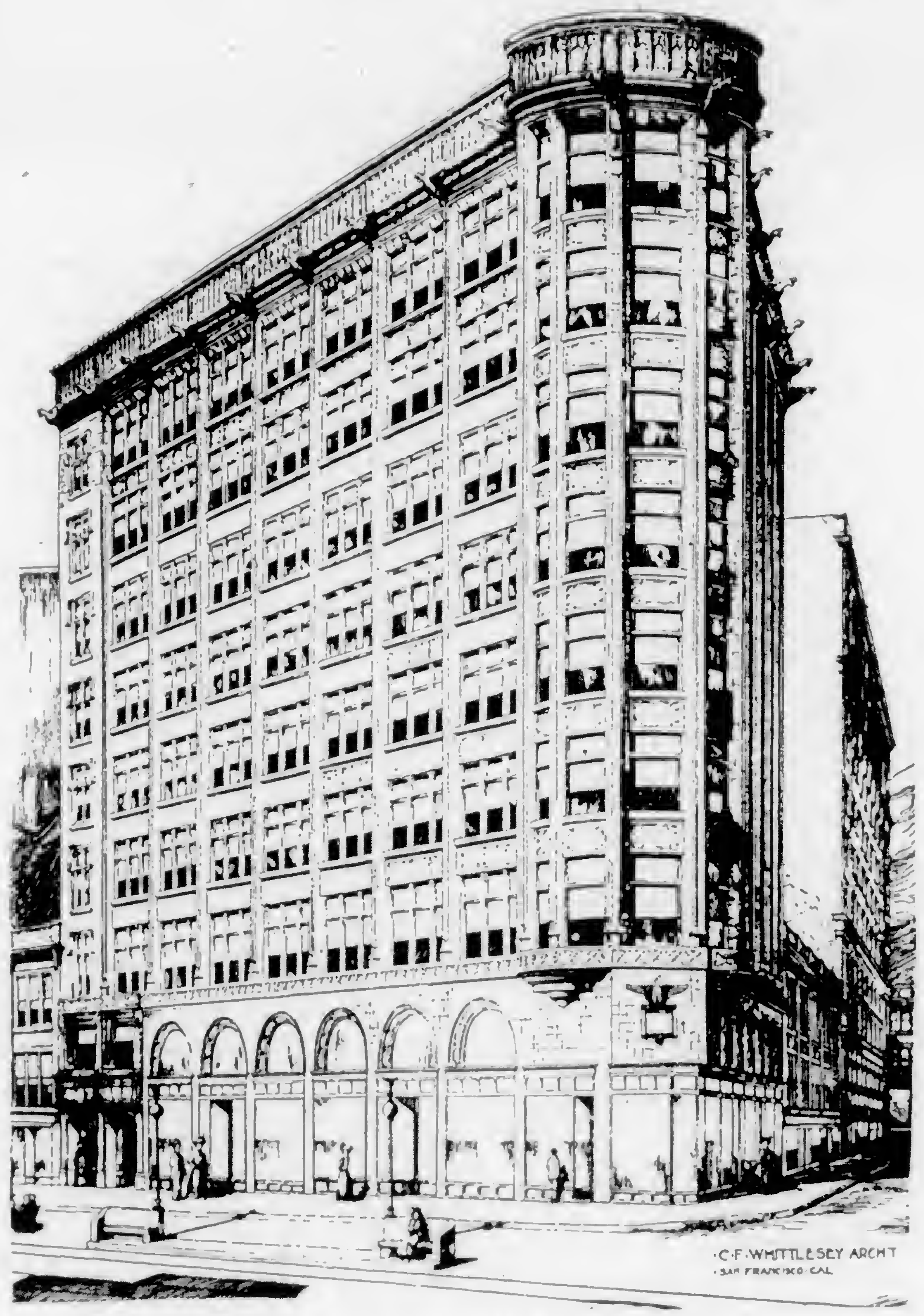
Residence of Mrs. Lucy Walker, West Adams St., Los Angeles
Chas. F. Whittlesey, Architect



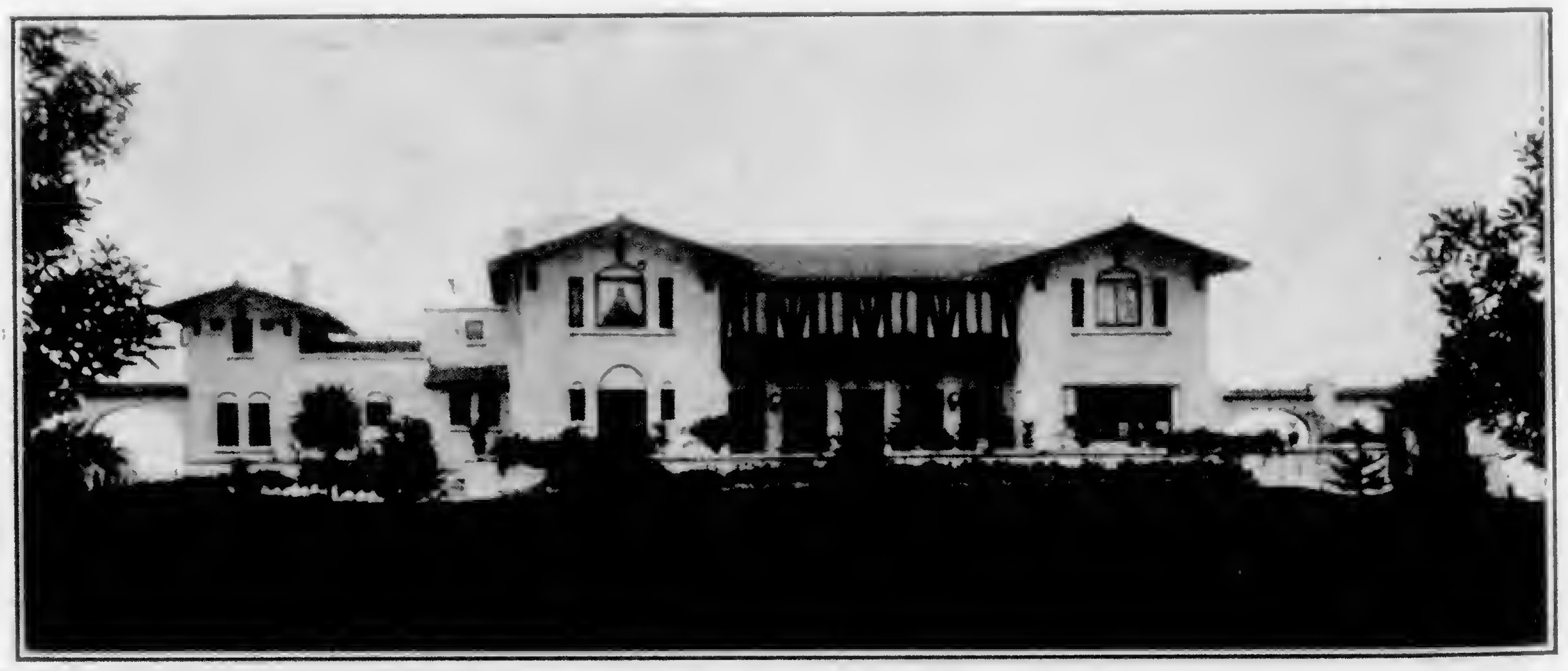
Residence of Mr. E. P. Bryan, Los Angeles (Front)
Chas. F. Whittlesey Architect



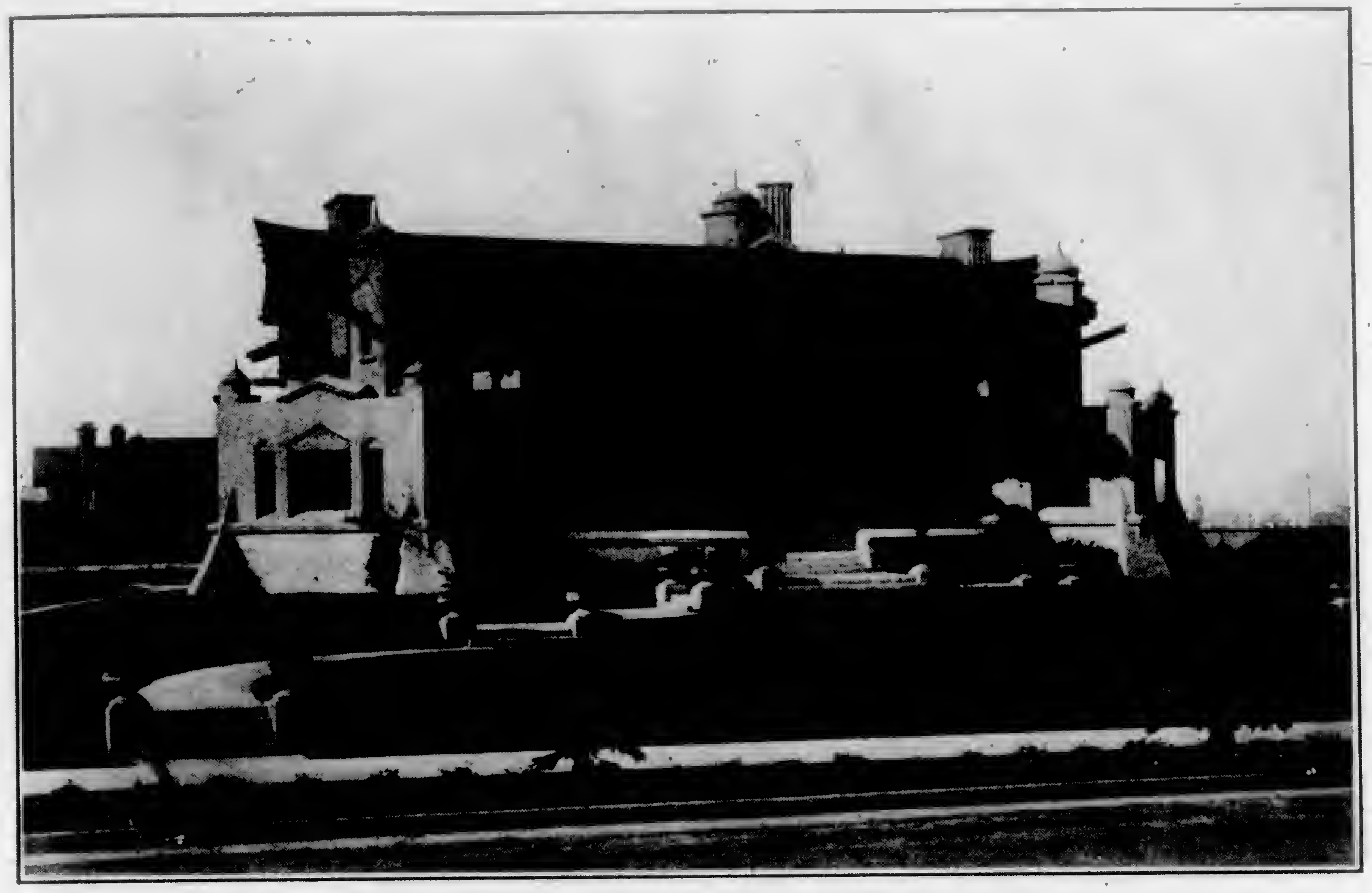
Reception Hall, Residence of Mrs. Lucy Walker, Los Angeles
Chas. F. Whittlesey, Architect



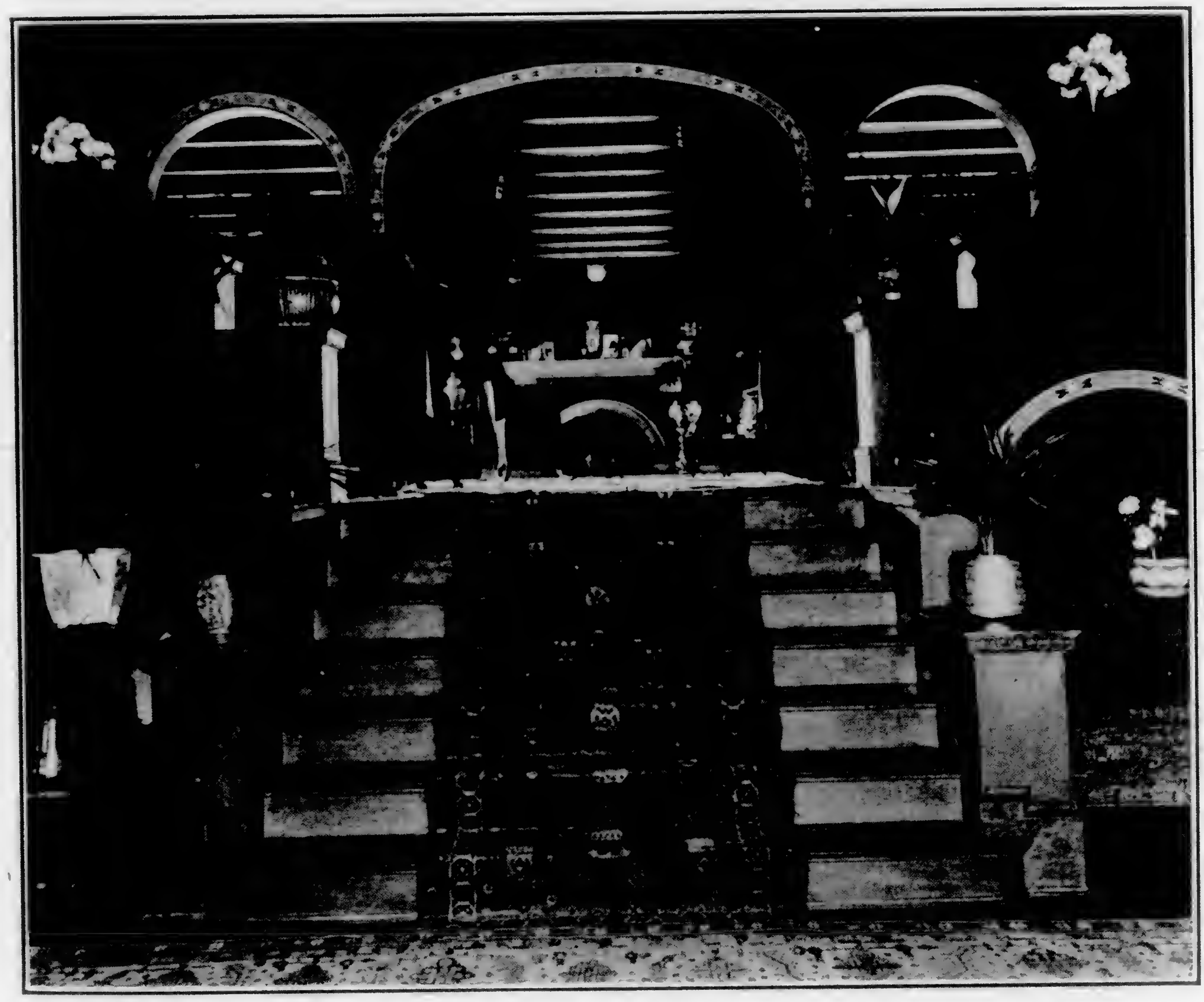
Pen and Ink Drawing of West Bank Building, San Francisco
Chas. F. Whittlesey, Architect



Residence of Mrs. Lucy Walker, West Adams St., Los Angeles
Chas. F. Whittlesey, Architect



Residence of Mr. E. P. Bryan, Los Angeles (Front)
Chas. F. Whittlesey Architect



Reception Hall, Residence of Mrs. Lucy Walker, Los Angeles
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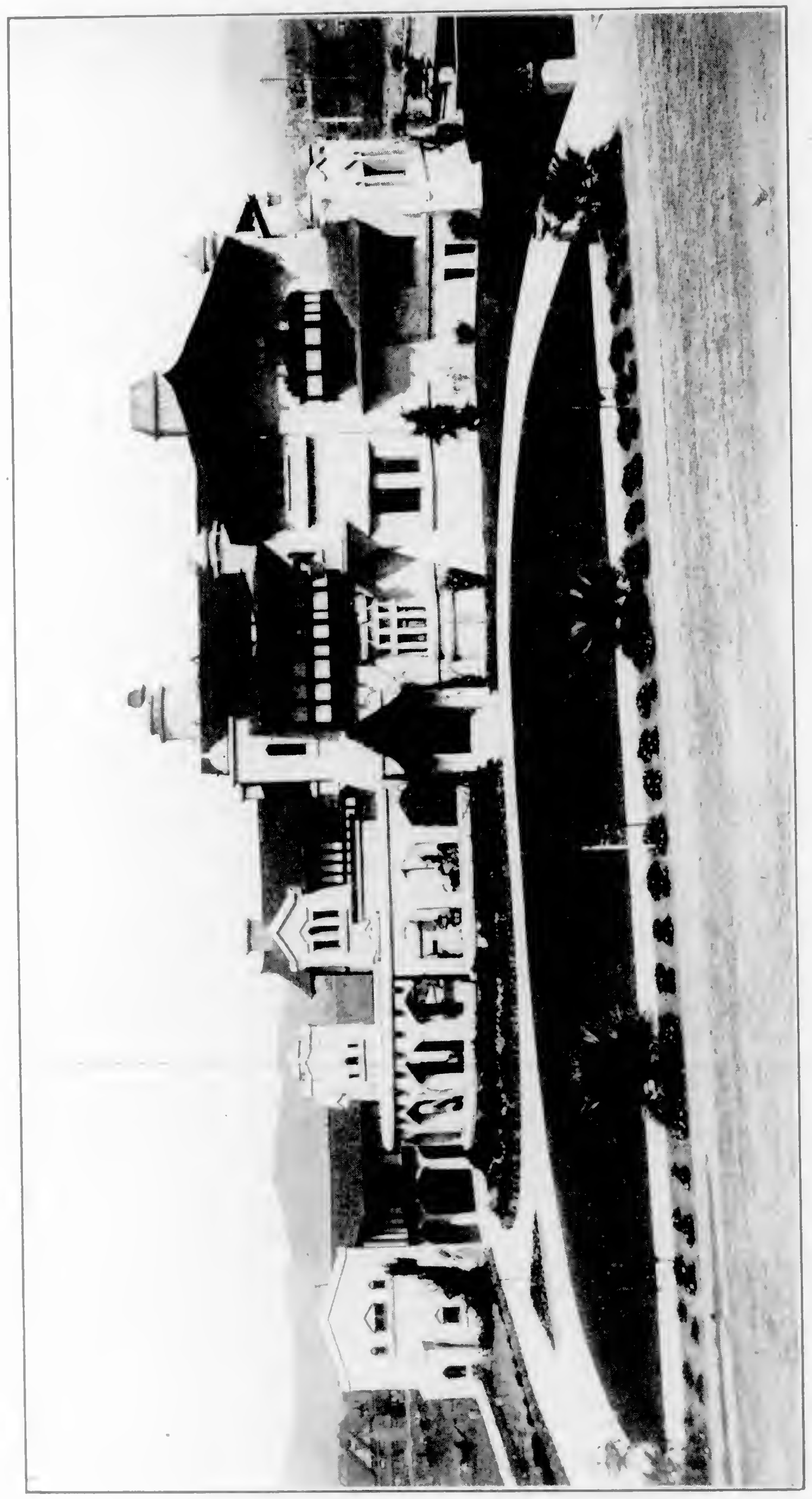
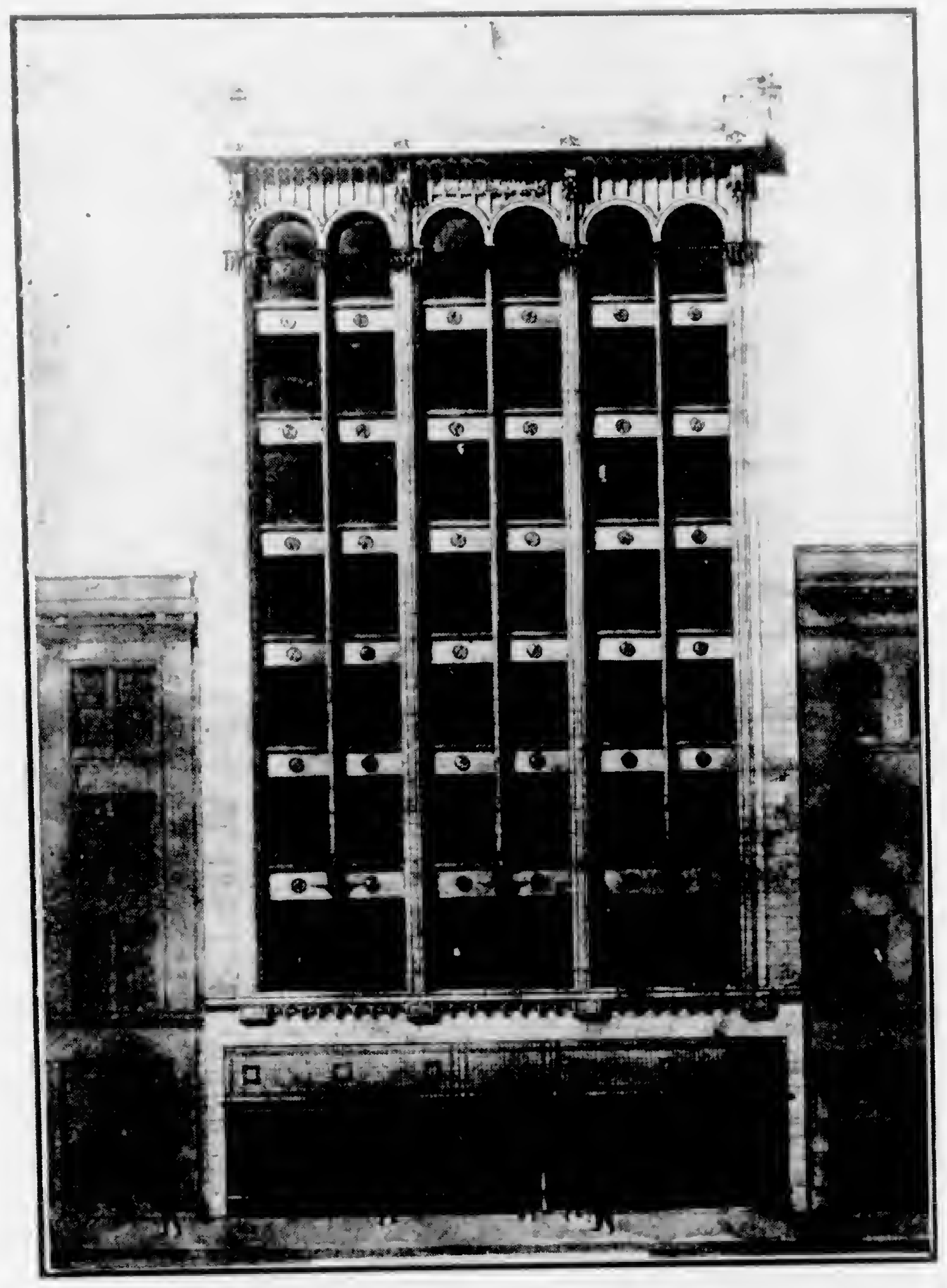
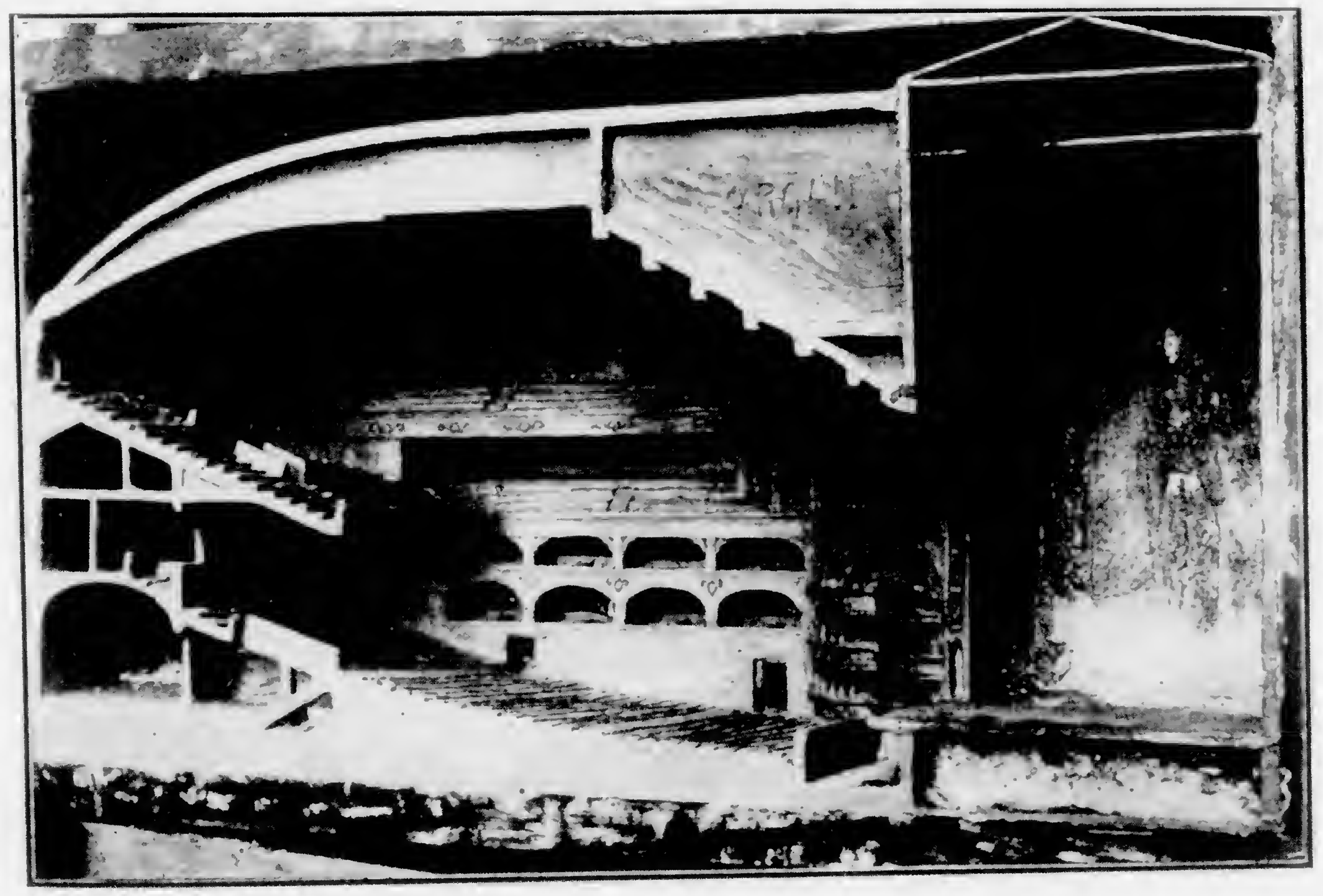


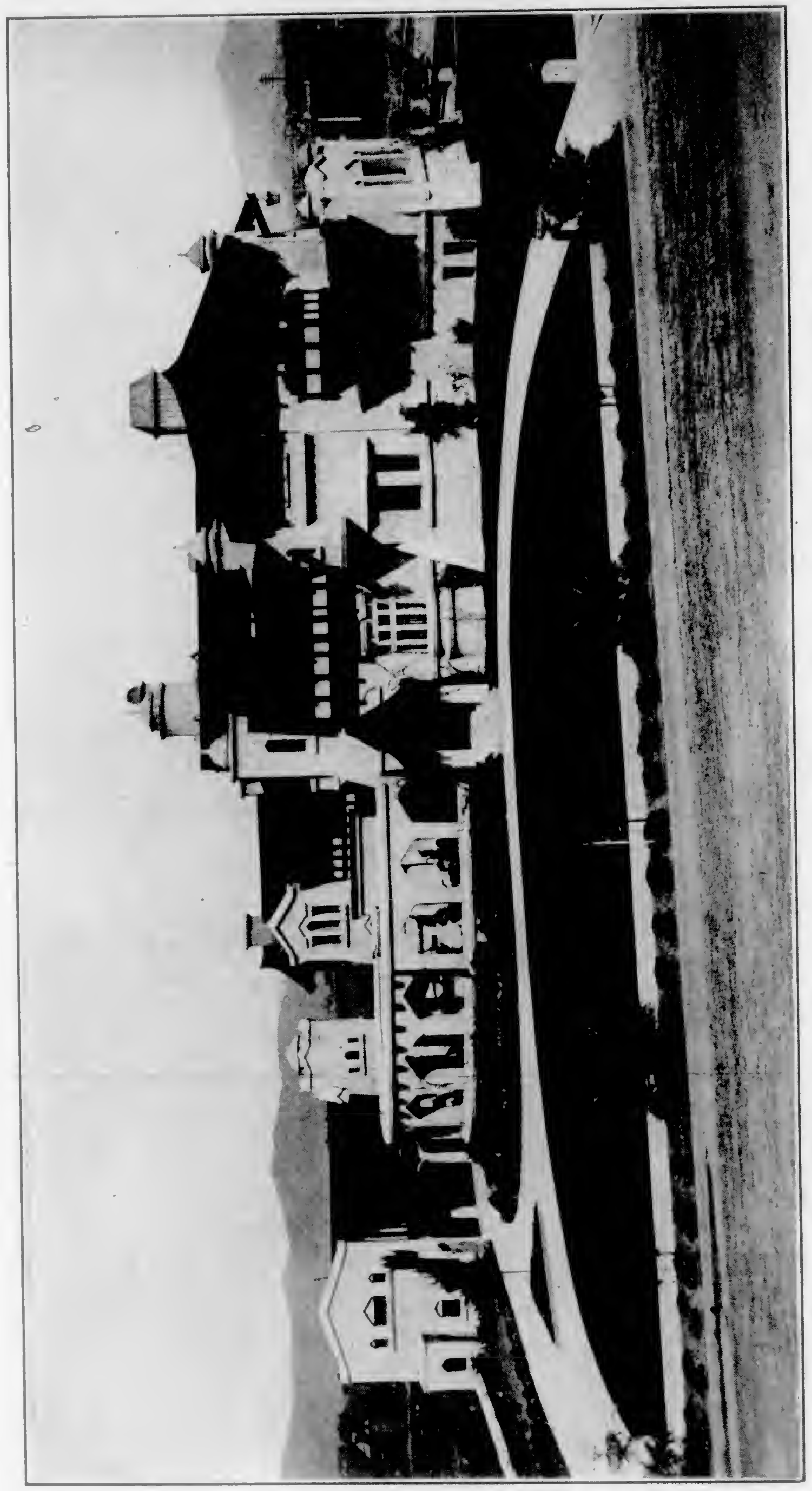
Side and Rear of Residence of Mr. E. P. Bryan, Los Angeles, showing Circular Carriage House
Chas. F. Whittlesey, Architect



Forrester Building, Los Angeles Chas. F. Whittlesey



Clay Model, Half Section of Auditorium, Auditorium Building, Los Angeles
Chas. F. Whittlesey, Architect



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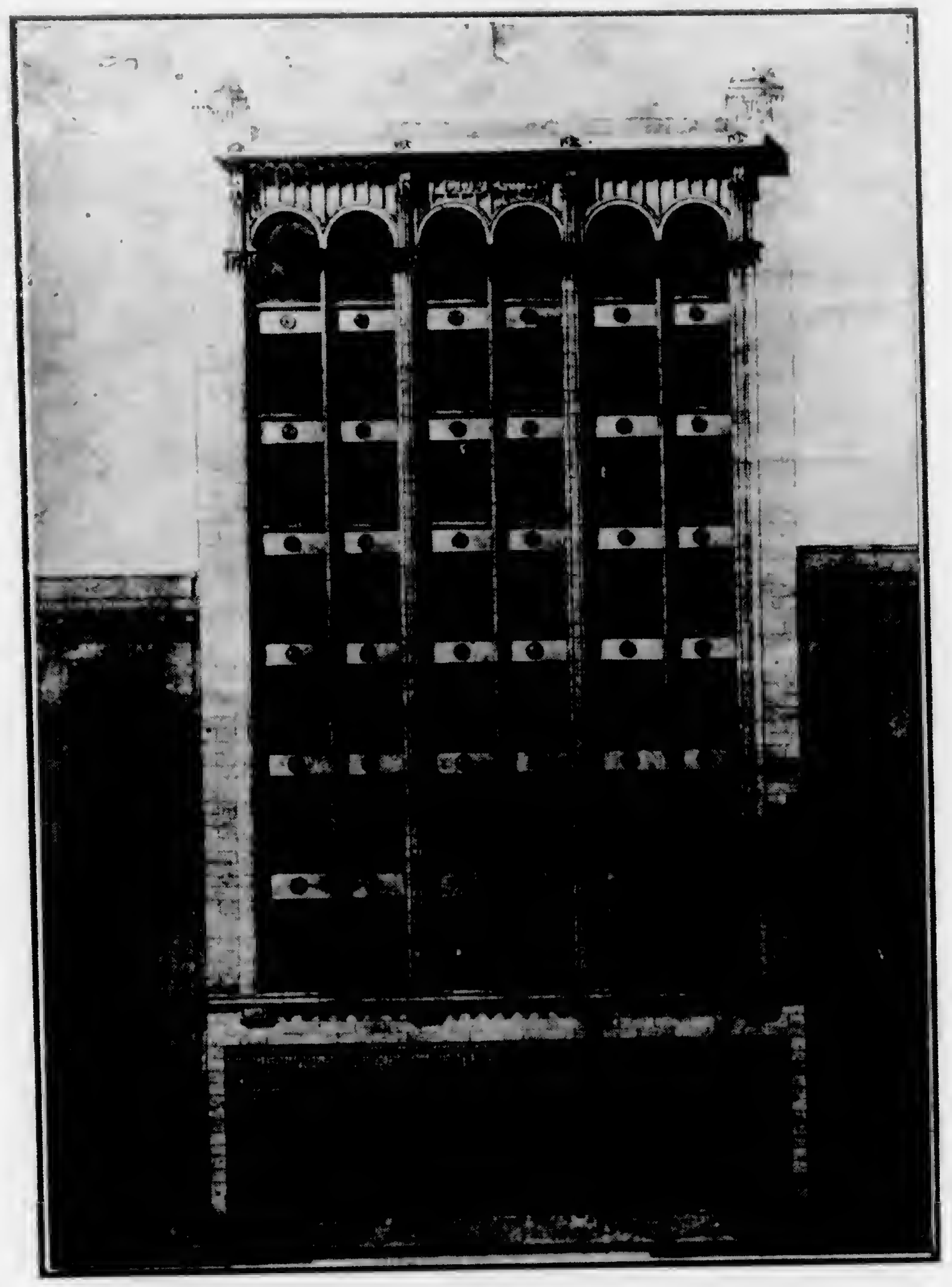
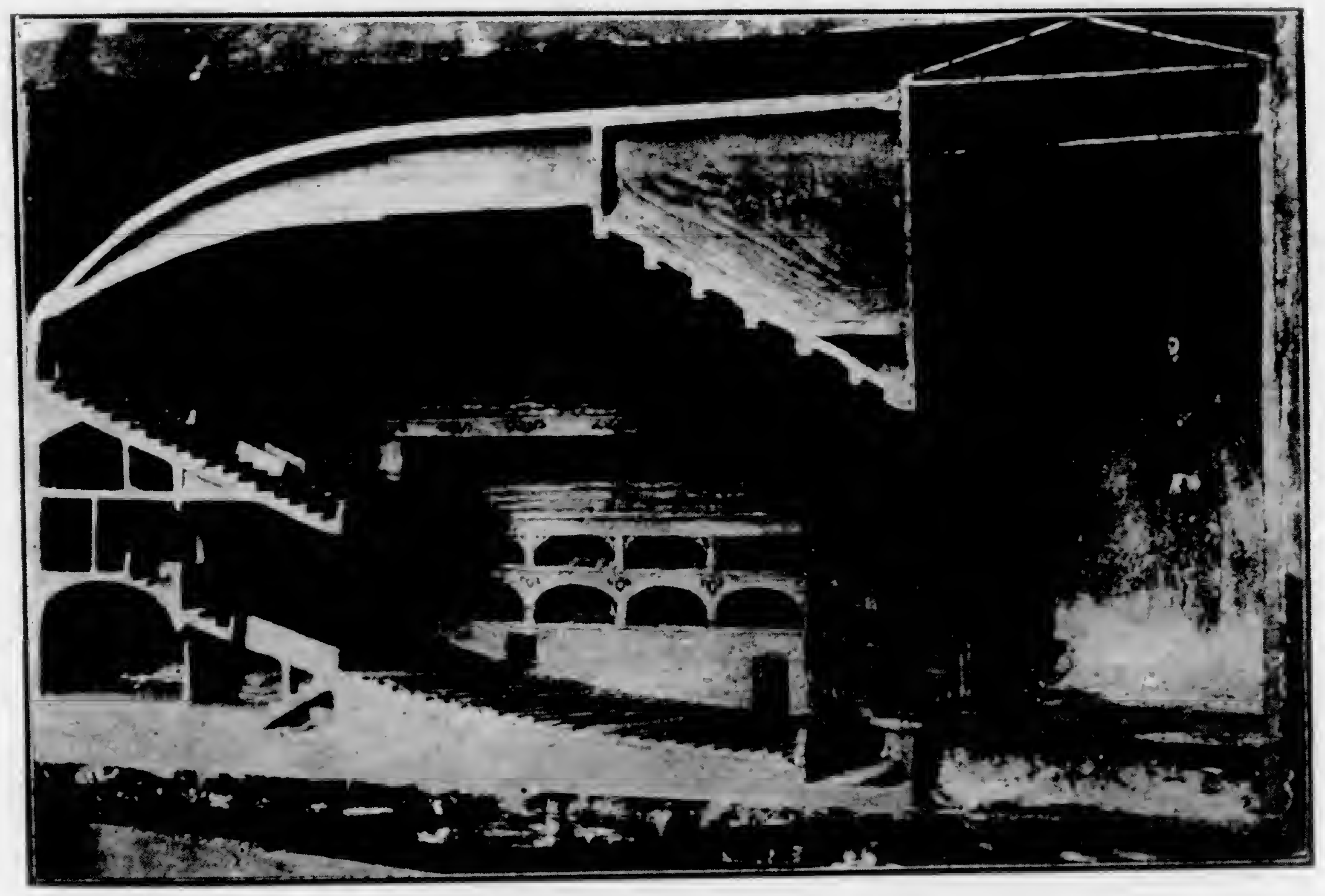
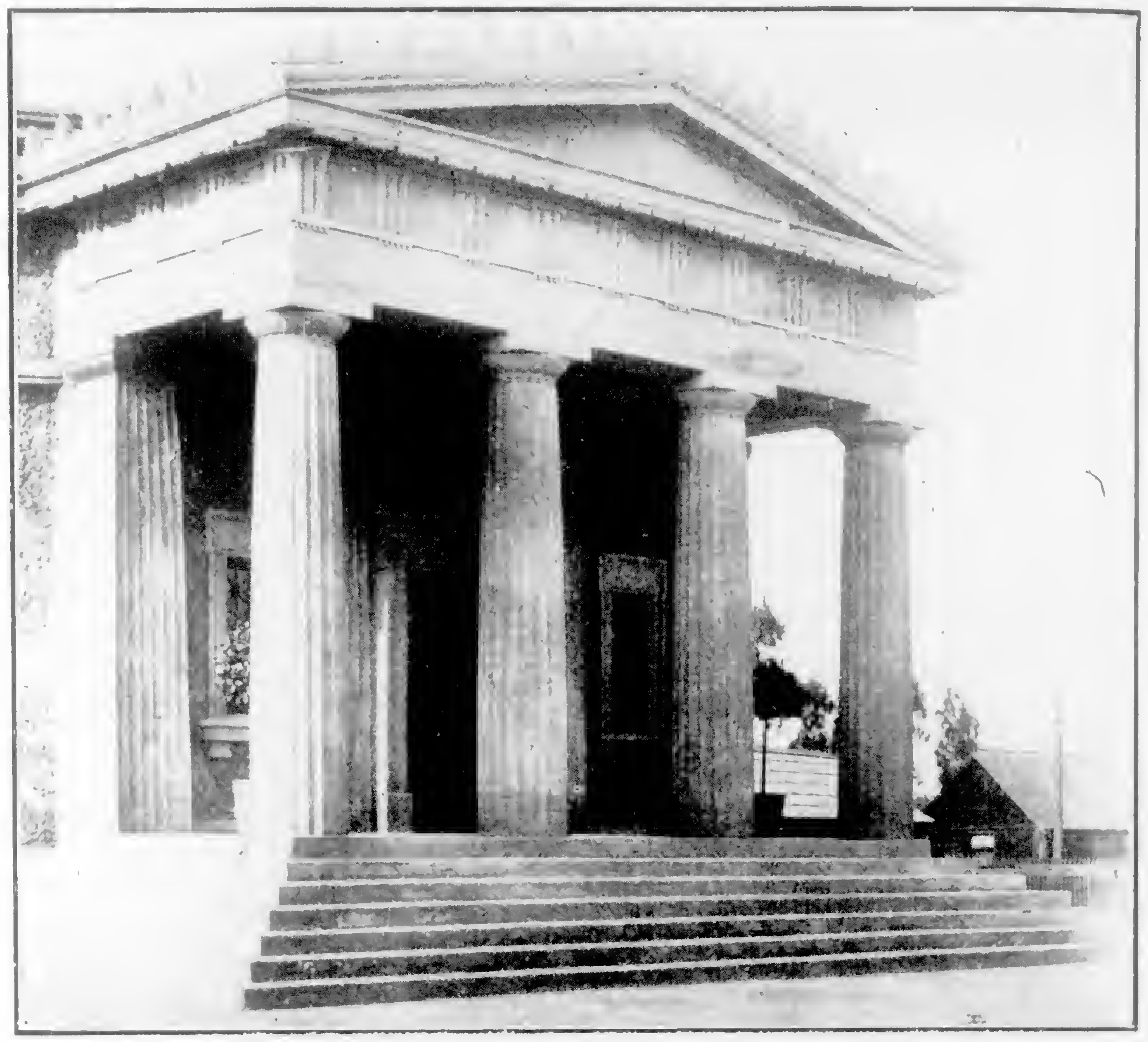
Chas. F. Whittlesey, Architect



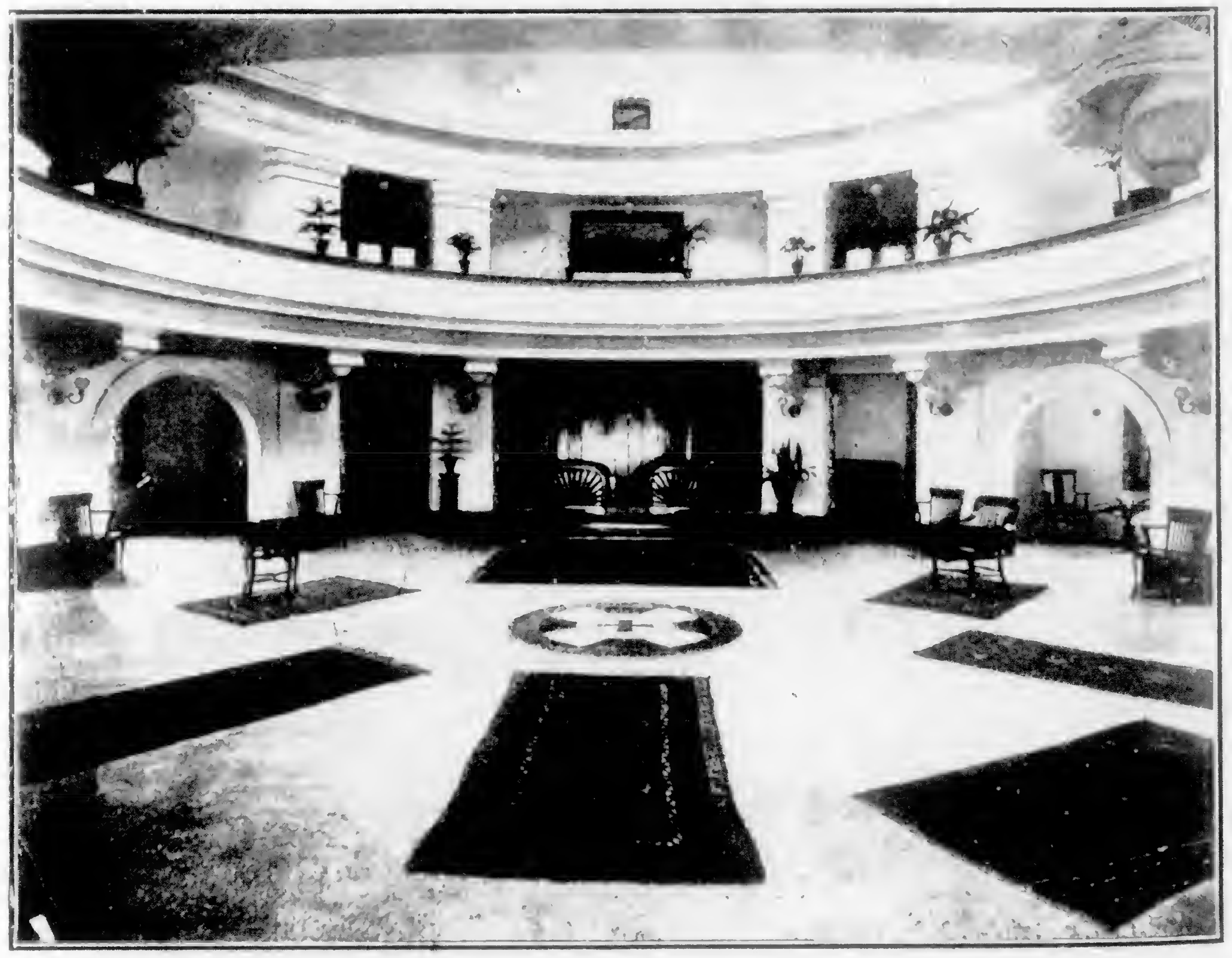
Forrester Building, Los Angeles. Chas. F. Whittlesey



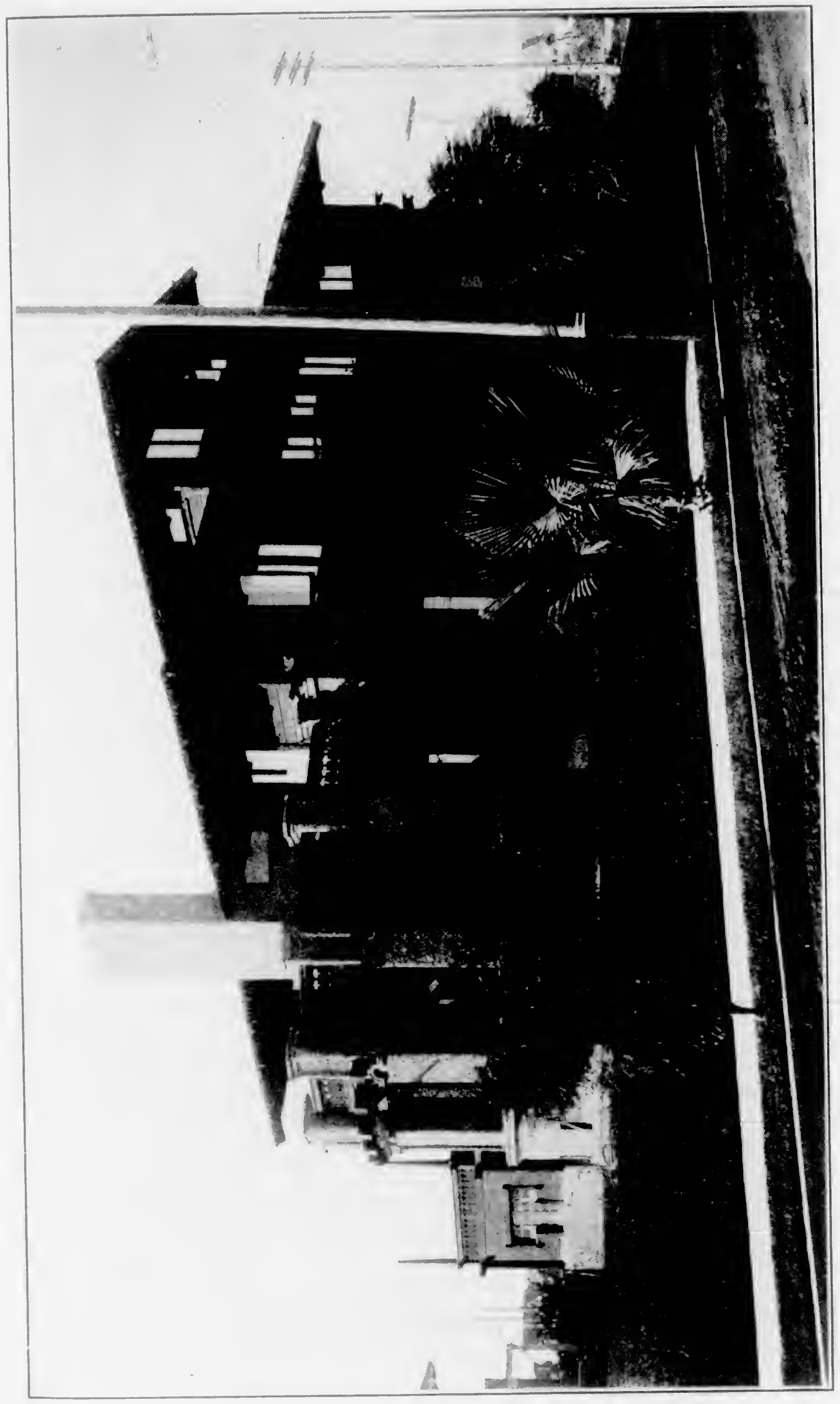
Clay Model, Half Section of Auditorium, Auditorium Building, Los Angeles
Chas. F. Whittlesey, Architect



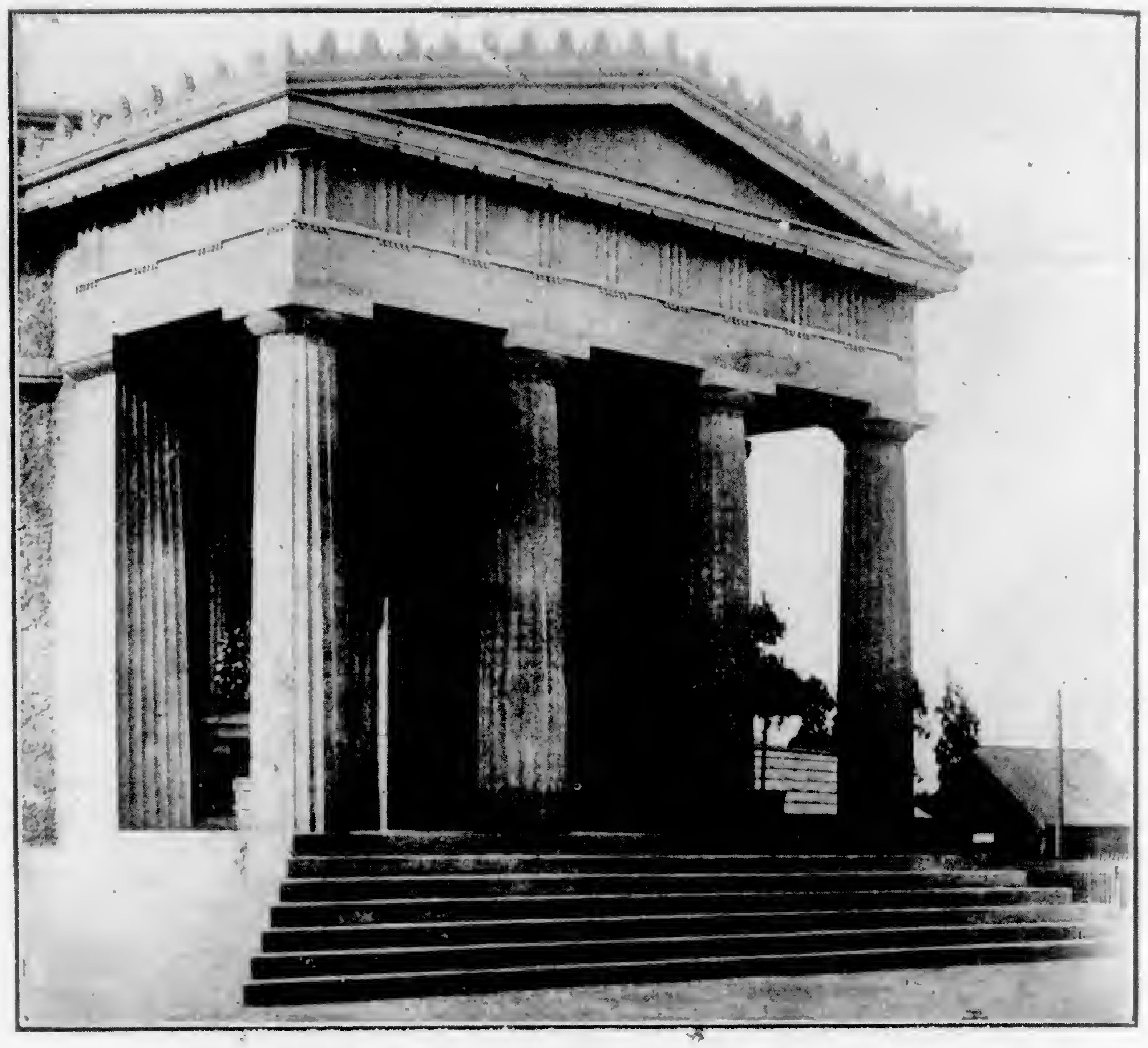
Classic Entrance to Crematory, Los Angeles   Chas. F. Whittlesey, Architect



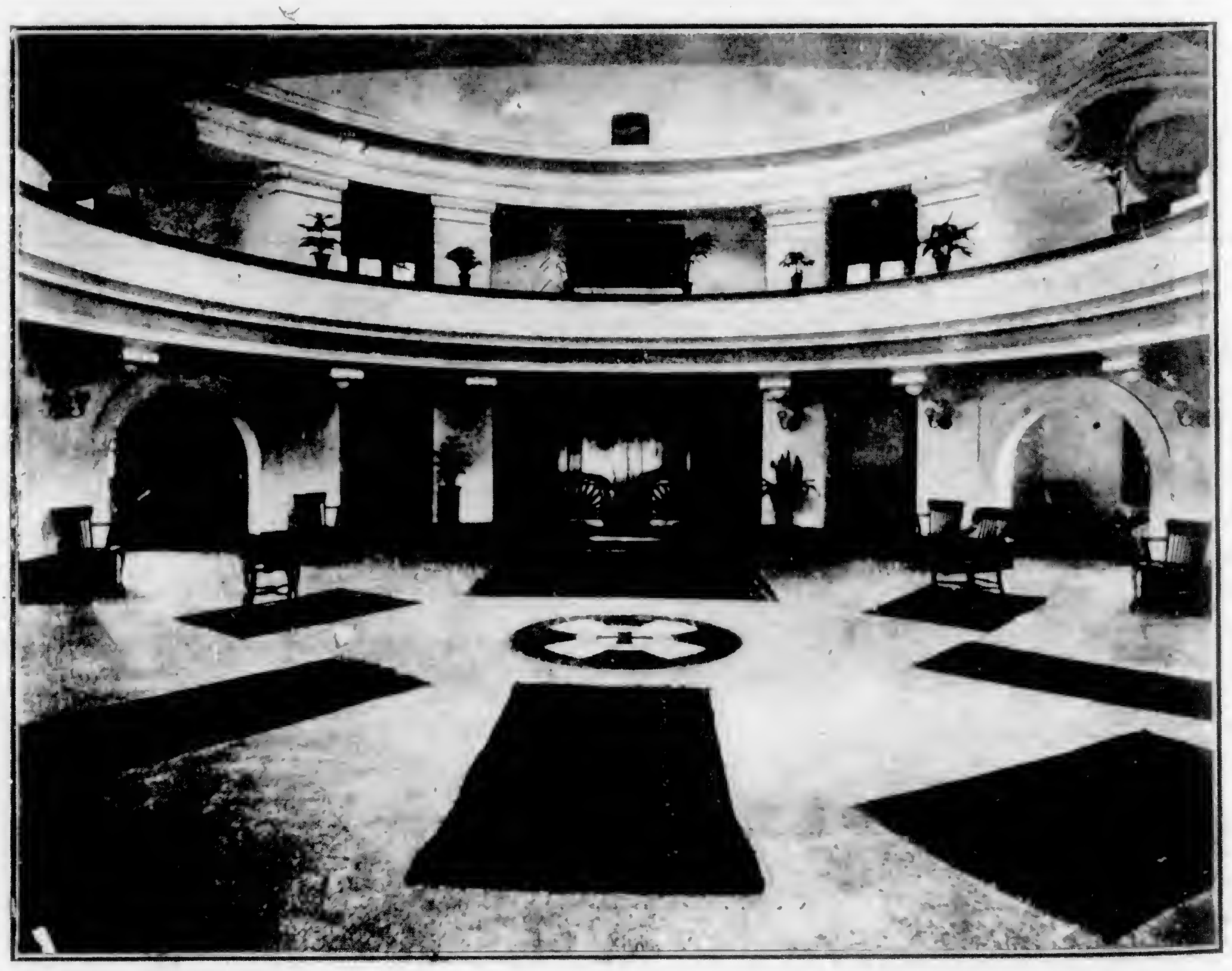
Interior Crematory, Los Angeles.   Chas. F. Whittlesey, Architect



Residence of C. F. Whittlesey, at Los Angeles
Chas. F. Whittlesey, Architect



Classic Entrance to Crematory, Los Angeles. Chas. F. Whittlesey, Architect



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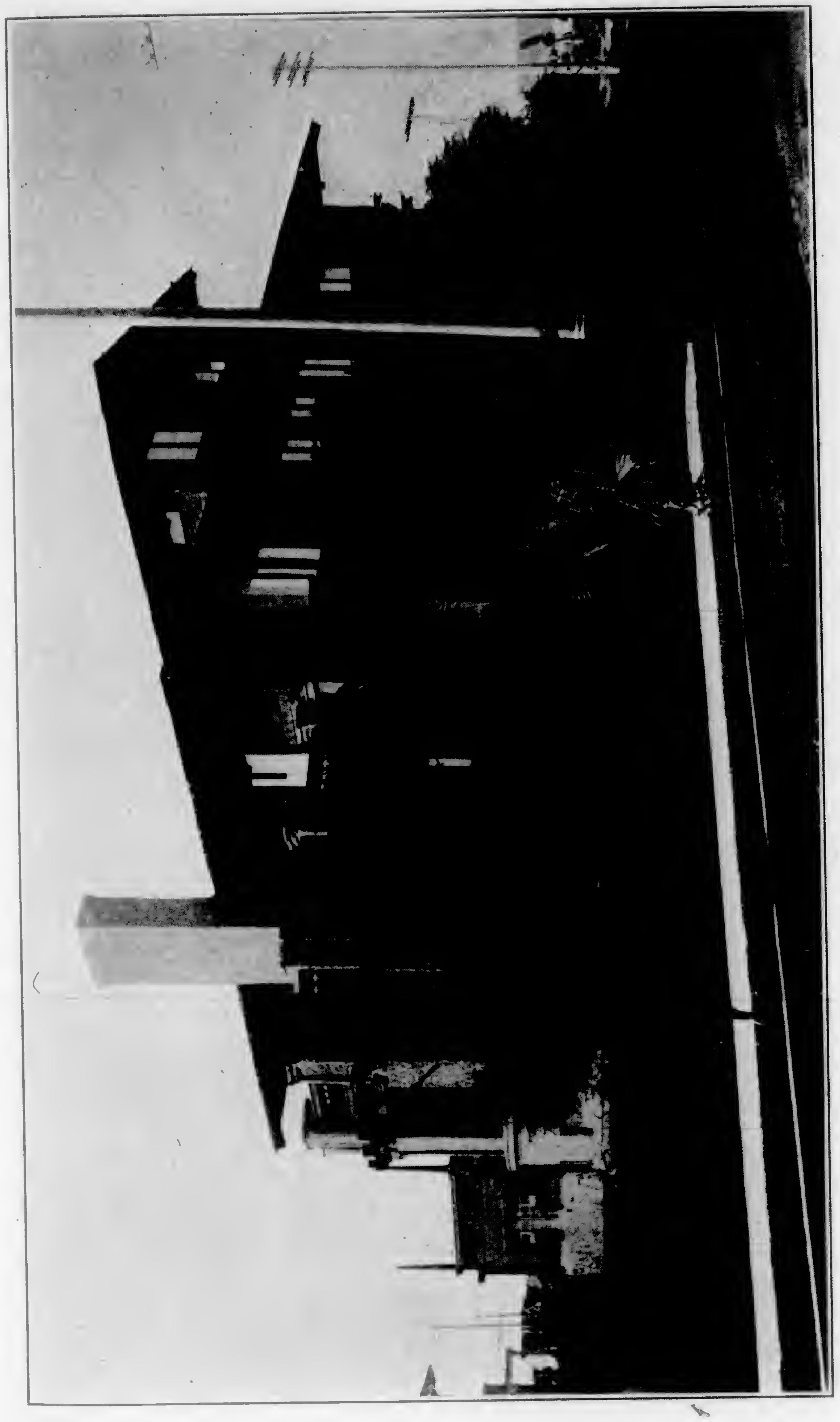
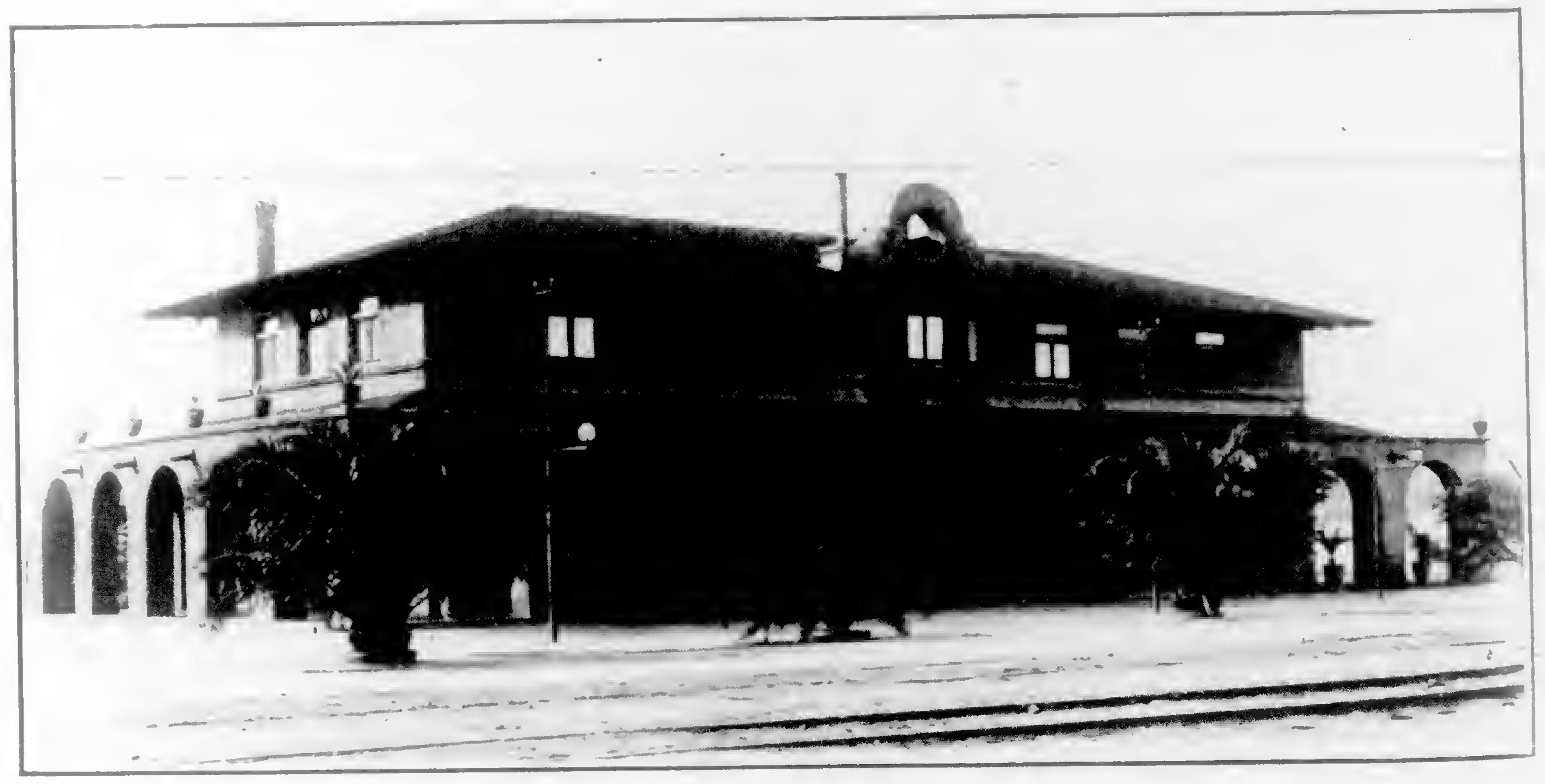


Residence of C. F. Whittlesey, at Los Angeles
Chas. F. Whittlesey, Architect

Residence of Mr. W. S. Bartlett, West Adams Street, Los Angeles
Chas. F. Whittlesey, Architect



Santa Fe Eating House at Merced, California
Chas. F. Whittlesey, Architect

On the other hand, in reinforced concrete constructions the metal, being in the form of simple rods, is easily and completely inbedded in the concrete, and concrete has been proven to be a perfect protection from corrosion for steel even when submerged for years in water. In fact, a rusted rod imbedded in concrete, becomes free from rust in a few months; the oxide of iron combining chemically with the cement, forms a true ferro concrete coating on the metal, which provides a perfect armor.

This construction is particularly adapted to factory buildings, because of its rigidity and freedom from vibration, so fatal to the life of line shafting and machinery. Concerning the durability of plain concrete without regard to its reinforcement, every one knows that it was the most imperishable building material of the Ancients, though made only of hydraulic lime, which will not compare with our modern Portland cements for strength. When a child I was taught that the Pyramids of Egypt were among the seven wonders, because of the immense size of the stones of which they were built, with no quarry within hundreds of miles; and the engineering problem was considered a marvel. It is now known that they are made of concrete; and were undoubtedly cast in the position they now occupy. Vitruvius, the ancient historian of Architecture and Engineering, wrote before the time of Christ, of the immense value of concrete as a building material and describes the works which were built of it centuries before his time. The dome of the Pantheon in Rome, 145 feet in diameter, was built more than twenty centuries ago, of concrete; and stands to-day in good condition.

The questions are often asked, Is concrete a safe building material for superstructures? Is there more risk attendant on this construction than on others? These are grave questions and should not be answered lightly. No class of construction is fool proof, and therefore rigid building laws, intelligent designing and competent supervision are assumed to be necesary for all kinds of construction for buildings of any importance. Last year several high brick walls collapsed in New York City, through carelessness in building. The same kind of accident has happened in Chicago several times, and in other cities. The fact that brick walls have collapsed would not influence you to condemn the use of brick as bad construction. Brick architecture has been used since before the earliest records of the Egyptians. Each one of you would build a brick wall to any reasonable height without fear of consequences because you feel that you know how it should be done, and are confident that you are capable of supervising it to a successful result.

Many failures in steel structures have occurred in recent years in bridges and buildings, some of them with very grave fatalities. Some of them have been due to faulty design; others to bad assembling. These are never offered in evidence as a reason for abandoning steel as a structural material.

The ordinary lug and bracket construction for assembling members, in use in most of our steel buildings, would not in many cases bear the scrunity of an expert, and in an actual test in comparison with the connections in a modern reinforced concrete building, would prove feeble and flimsy. I have seen a riveted bracket on a steel column carrying a girder in which one of the rivet heads had popped off. The bracket was struck several blows with a heavy hammer, and out of five rivets only one had remained. An investigation developed the fact that the rivets were made of old rail steel, which was badly crystallized.

It is true that there have been a few failures by partial collapse of reinforced concrete structures . But considering that work has been attempted in this material by builders having but a very slight knowledge of the subject, it is a great wonder that more failures have not occurred. The

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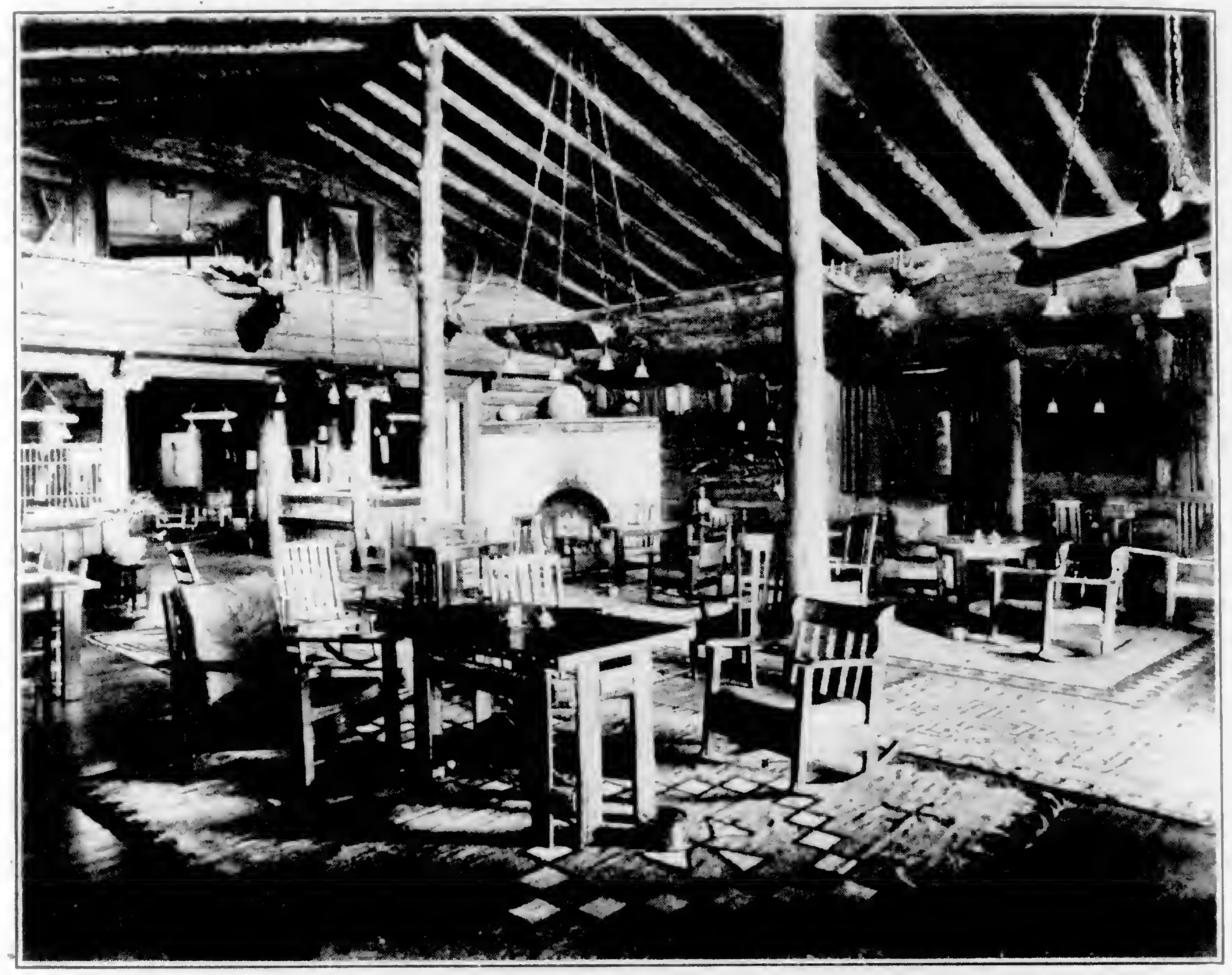
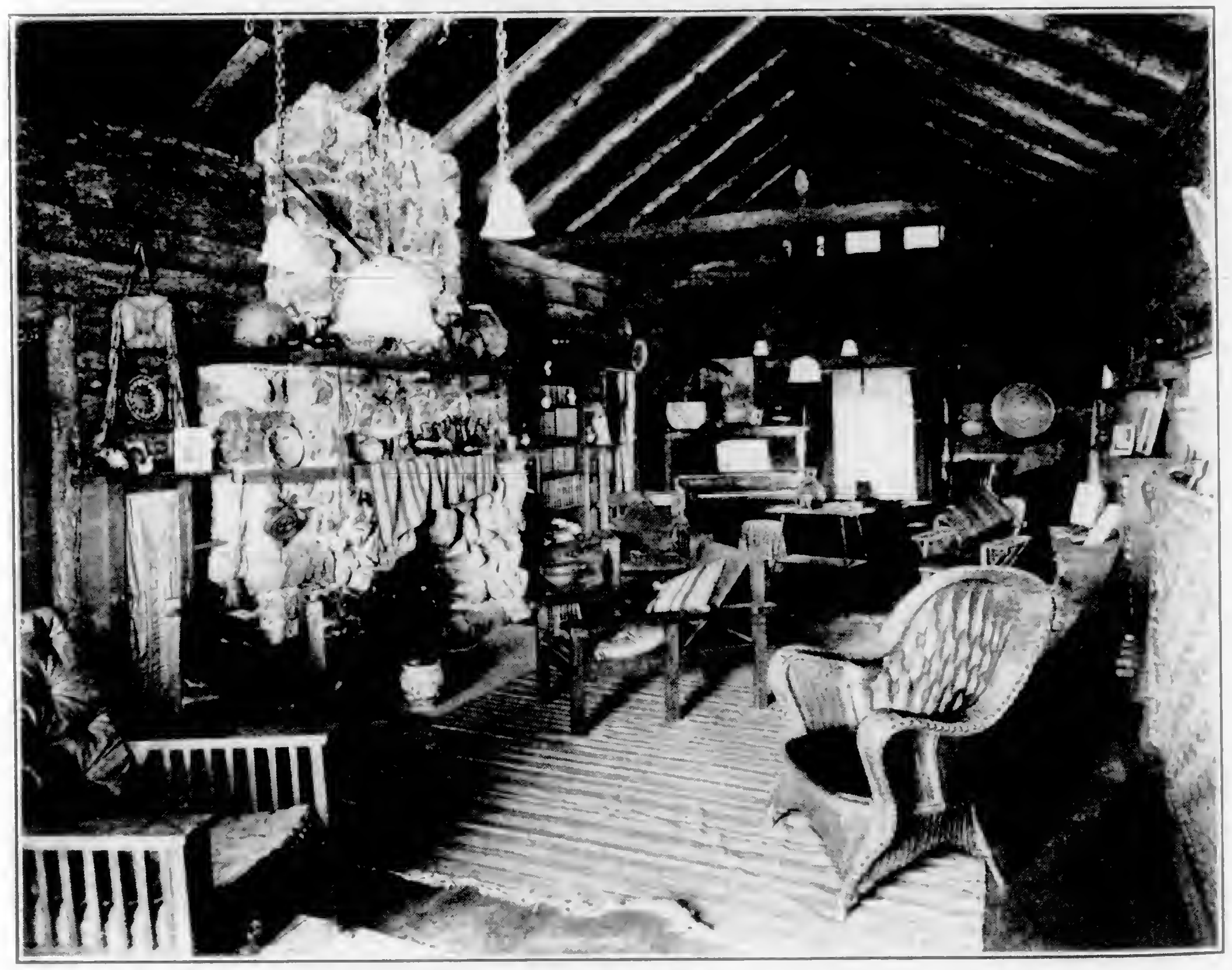
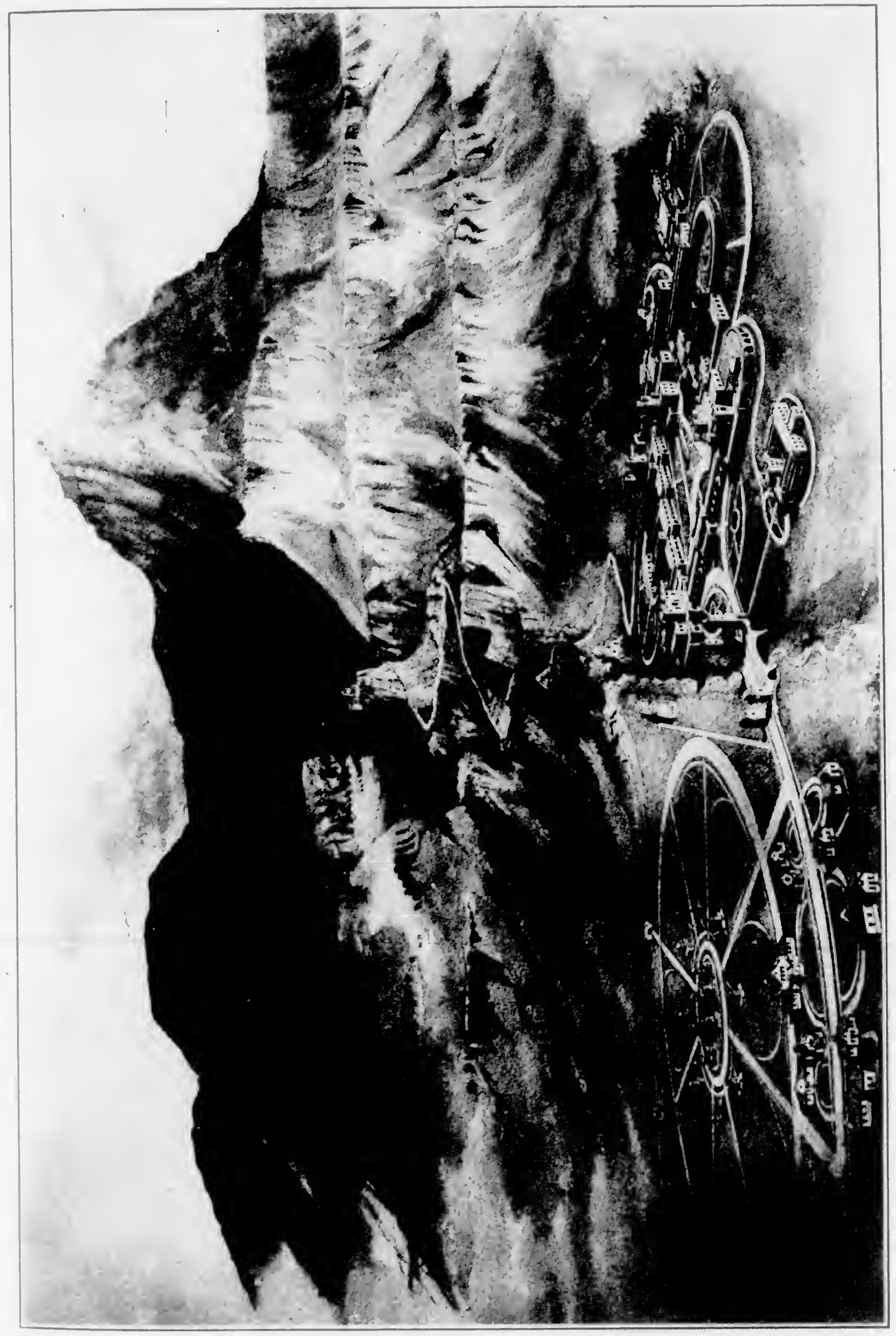


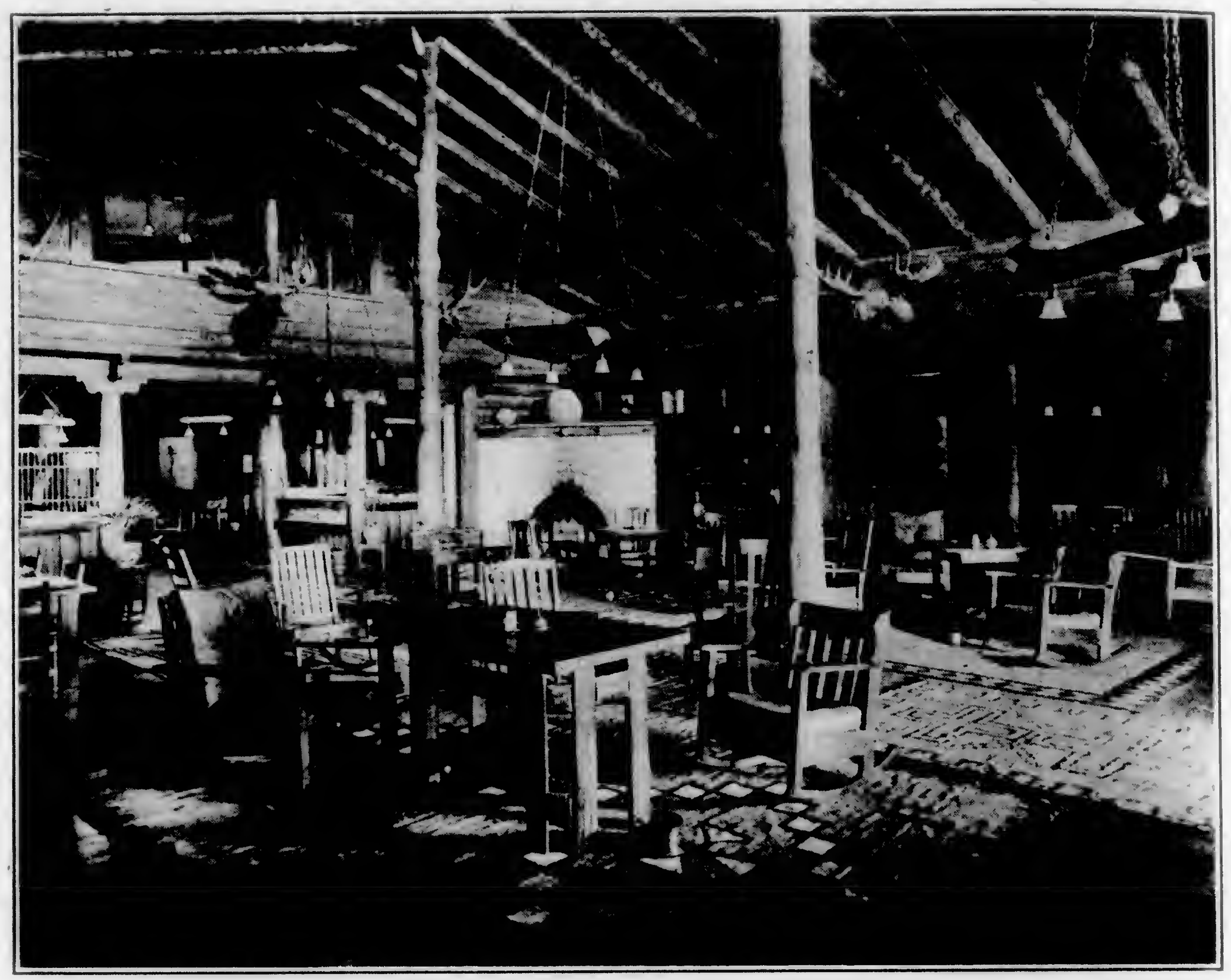
Men's Lounging Room in Hotel El Tovar at Grand Canyon. Chas. F. Whittlesey, Architect



Living Room in Residence of C. F. Whittlesey at Albuquerque, N. M. Chas. F. Whittlesey, Architect



Climatorium at Almagordo, New Mexico, adapted from Indian Pueblo Architecture
Chas. F. Whittlesey, Architect



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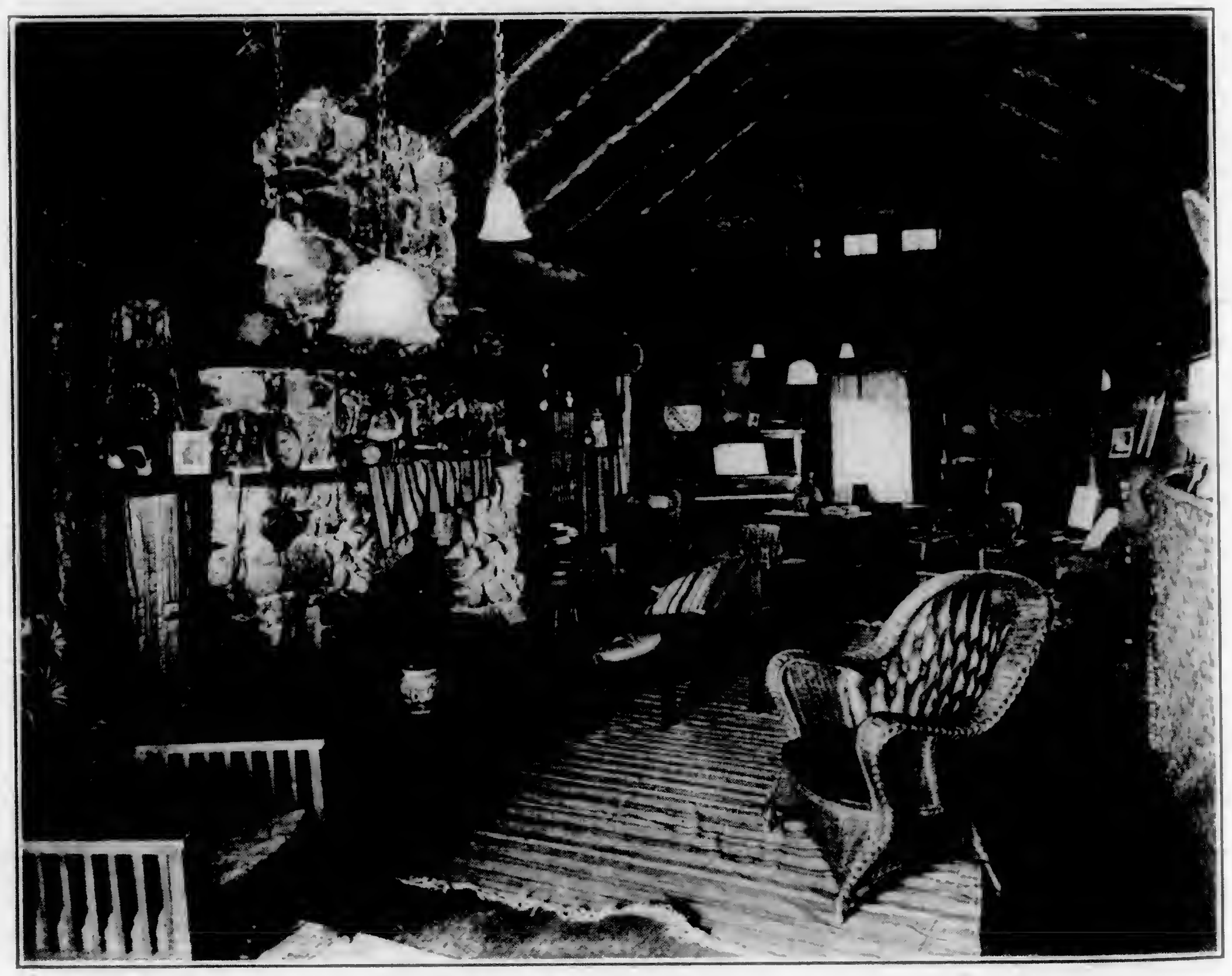
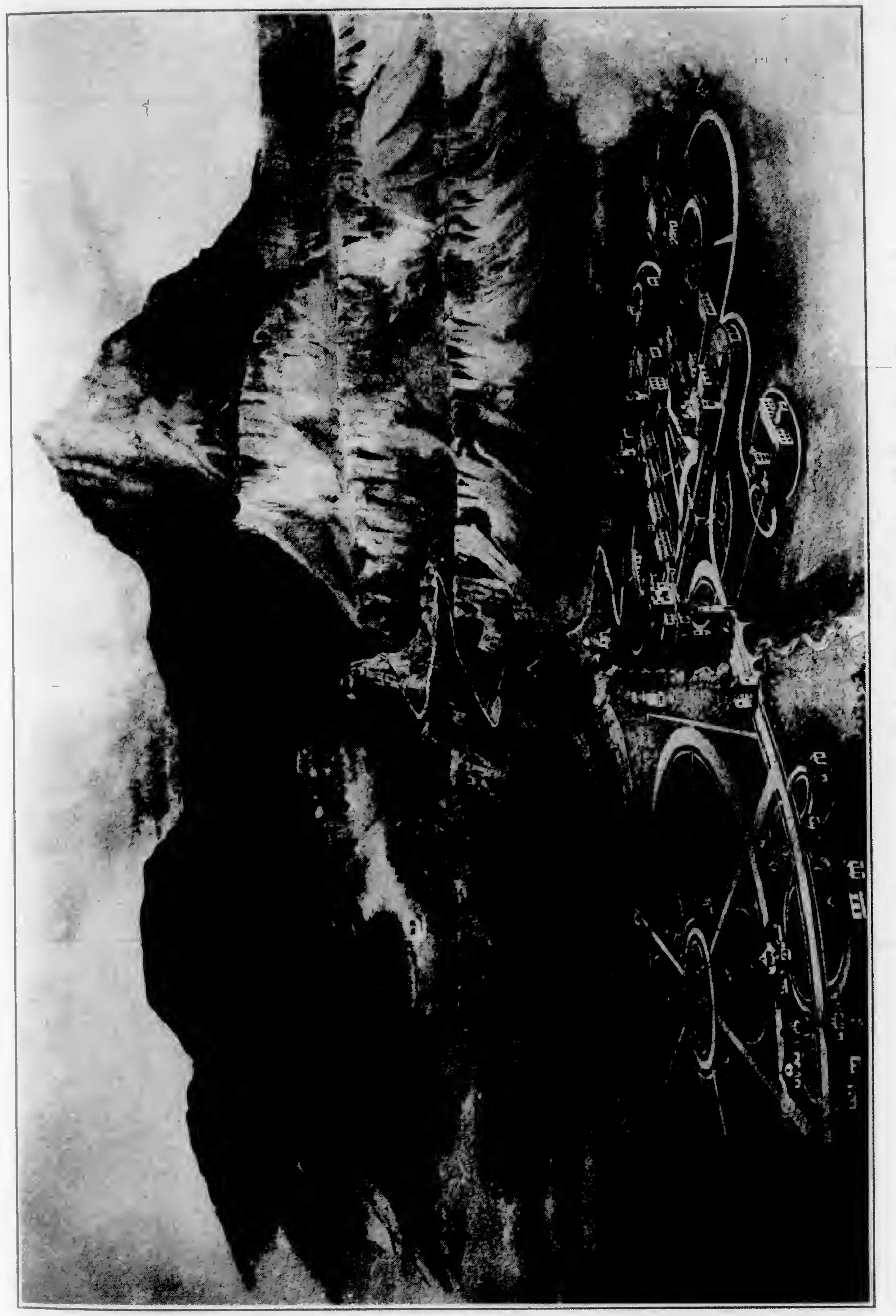


Living Room in Residence of C. F. Whittlesey at Alburquerque, N. M. Chas. F. Whittlesey, Architect



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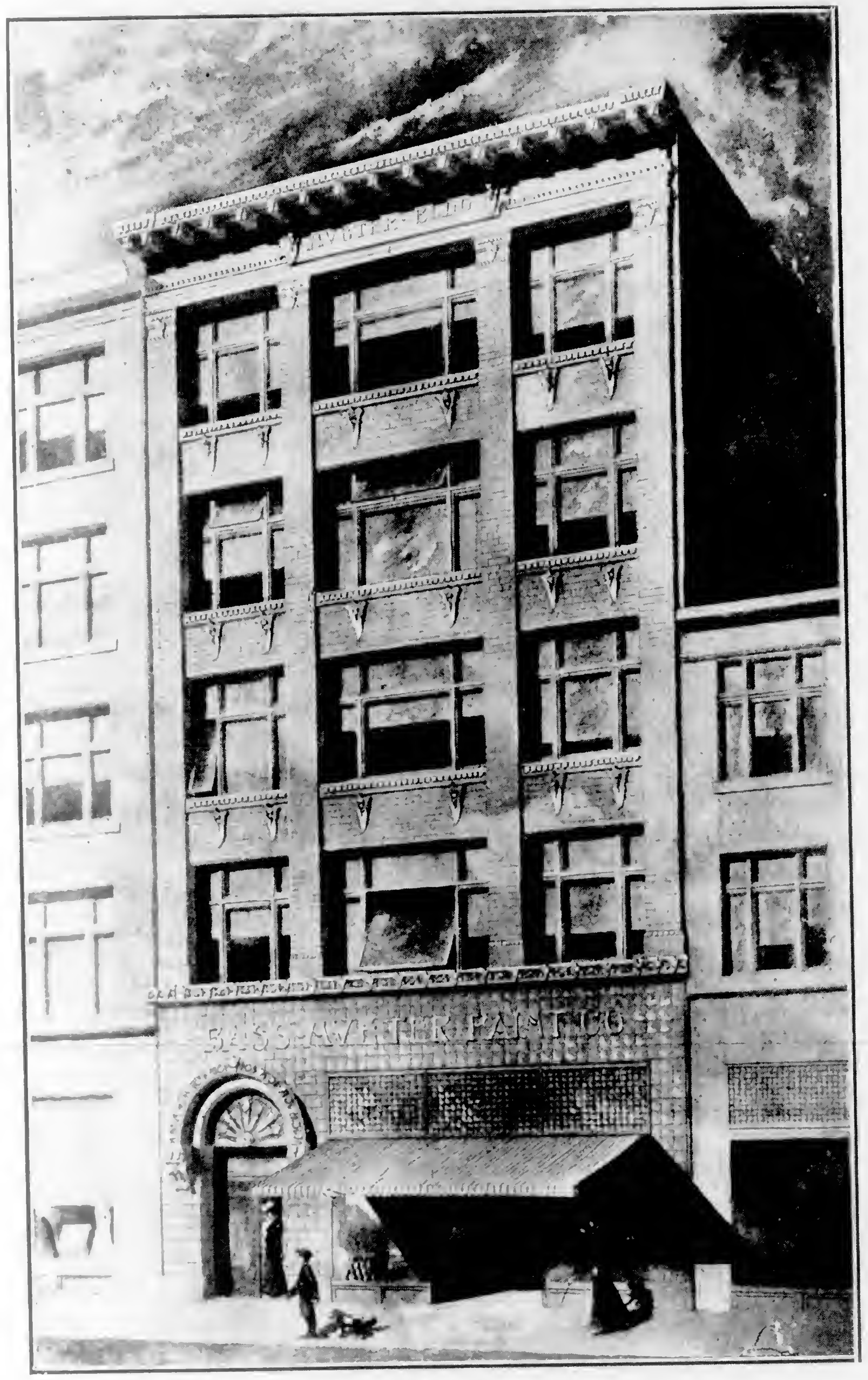
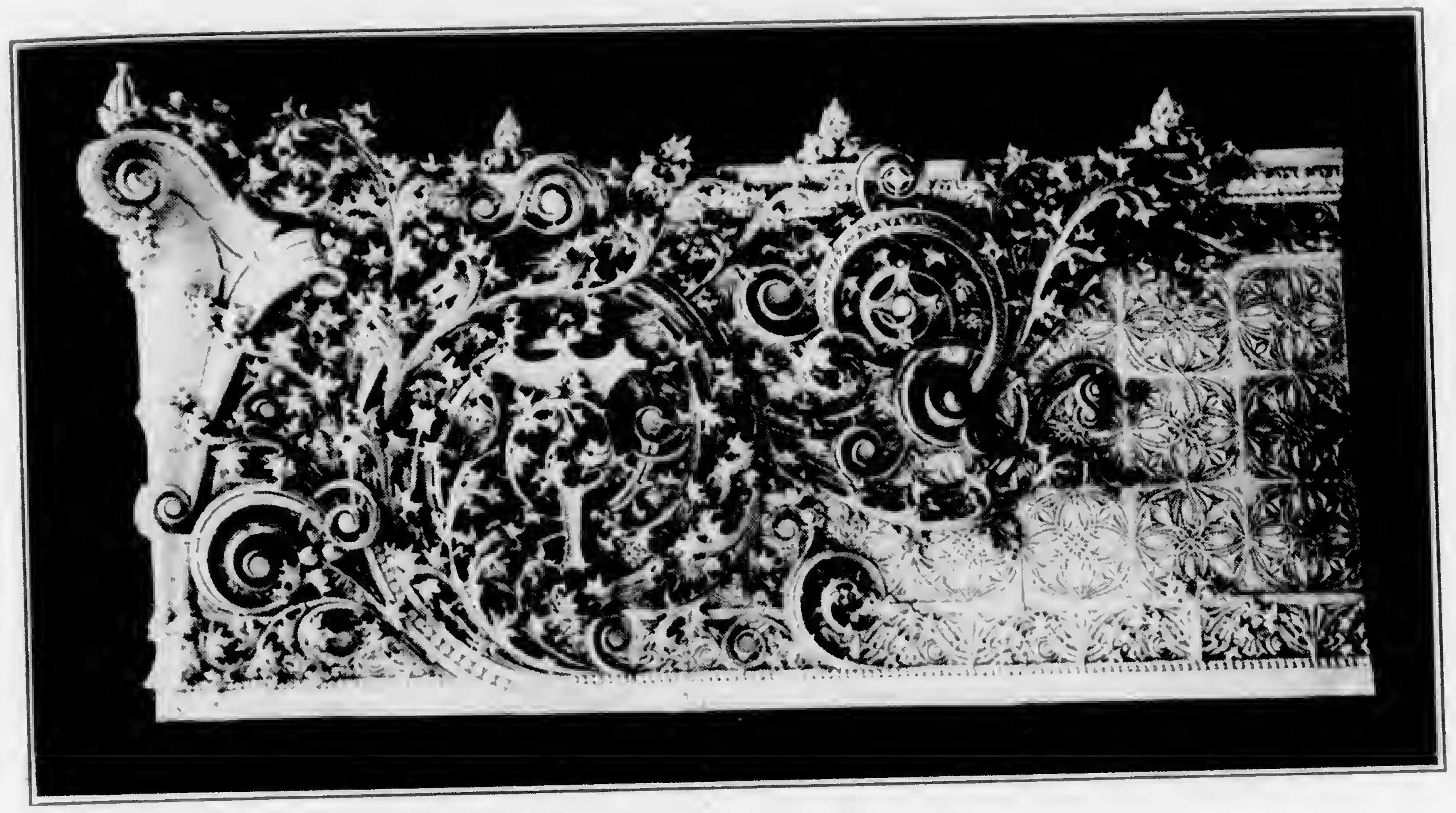
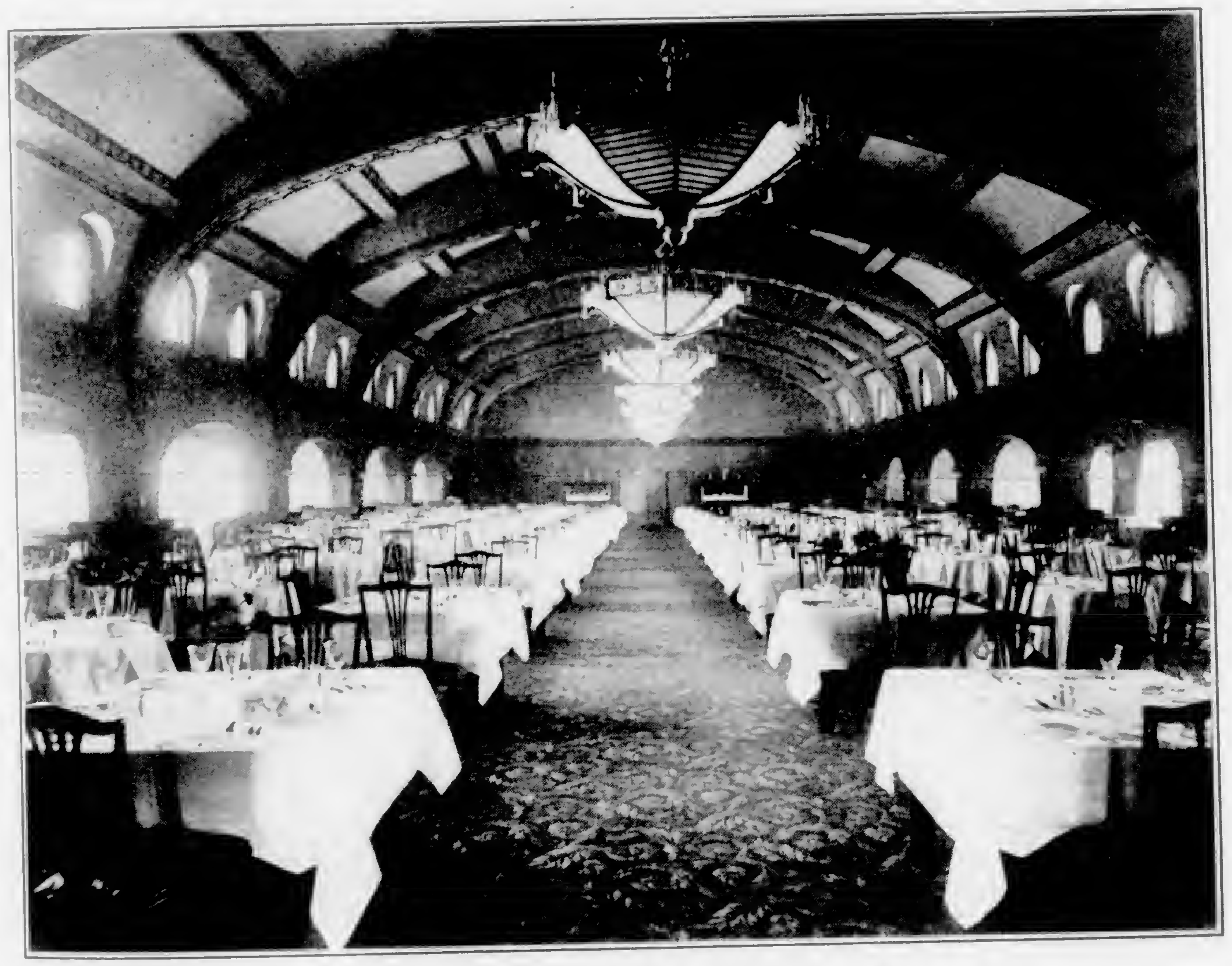


The Hueter Building, San Francisco. New Home of the Bass-Hueter Paint Company
Chas. F. Whittlesey, Architect

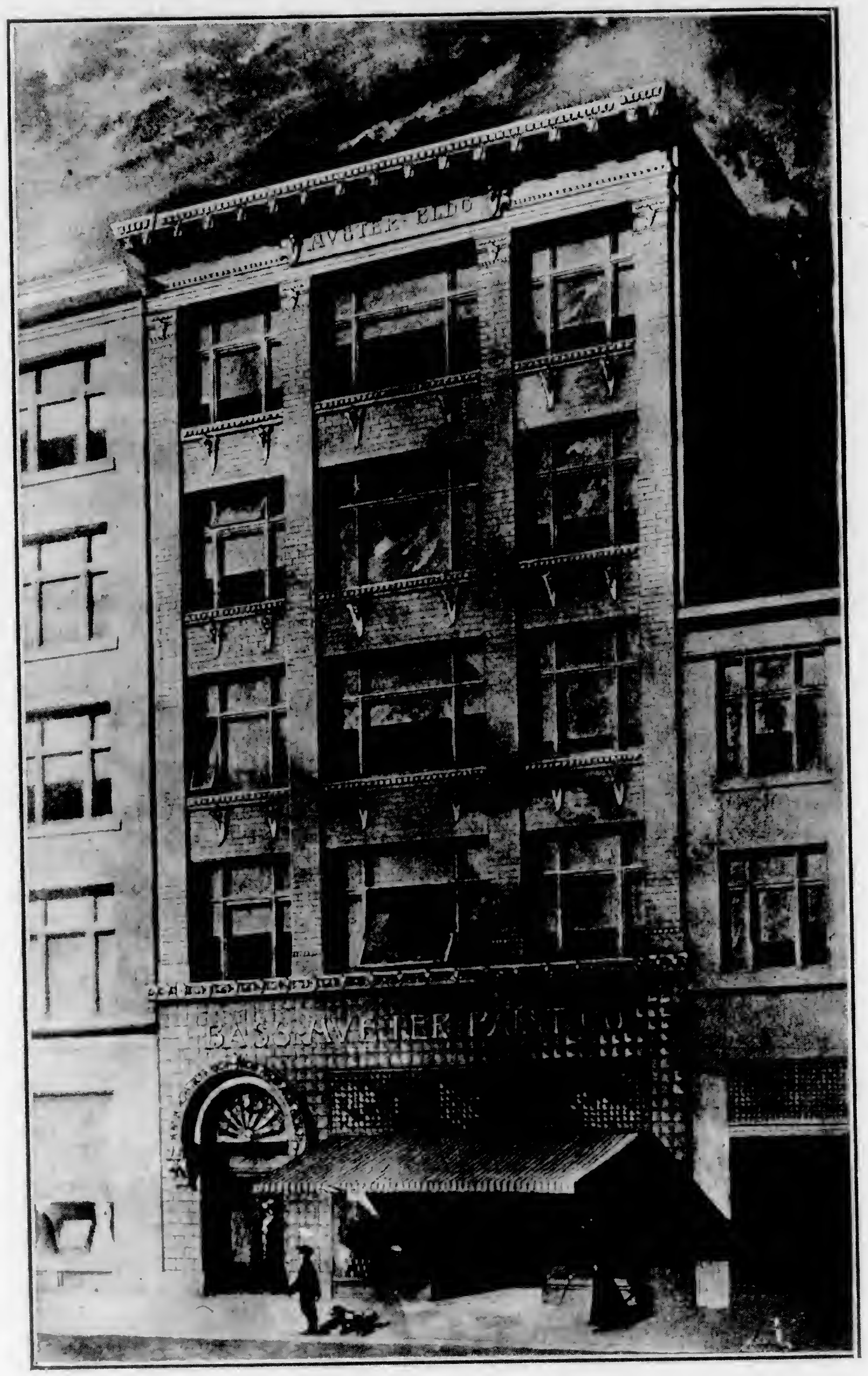
Equipped with Otis Elevators *Vonder Horst Bros., Contractors*



Detail of Canopy over Entrance of Pacific Building
Chas. F. Whittlesey, Architect



Dining Room, Haywards Hotel, Los Angeles
Chas. F. Whittlesey, Architect



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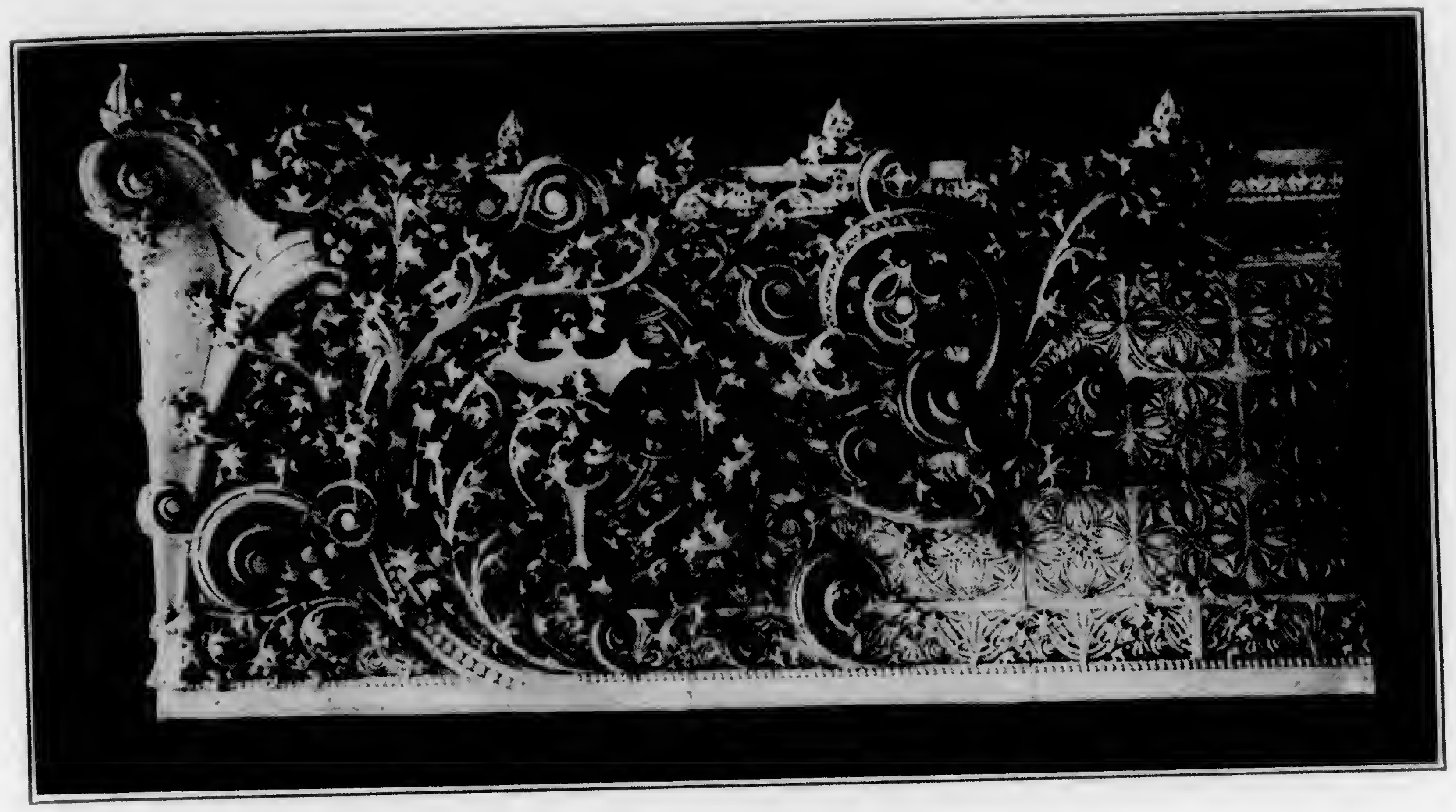

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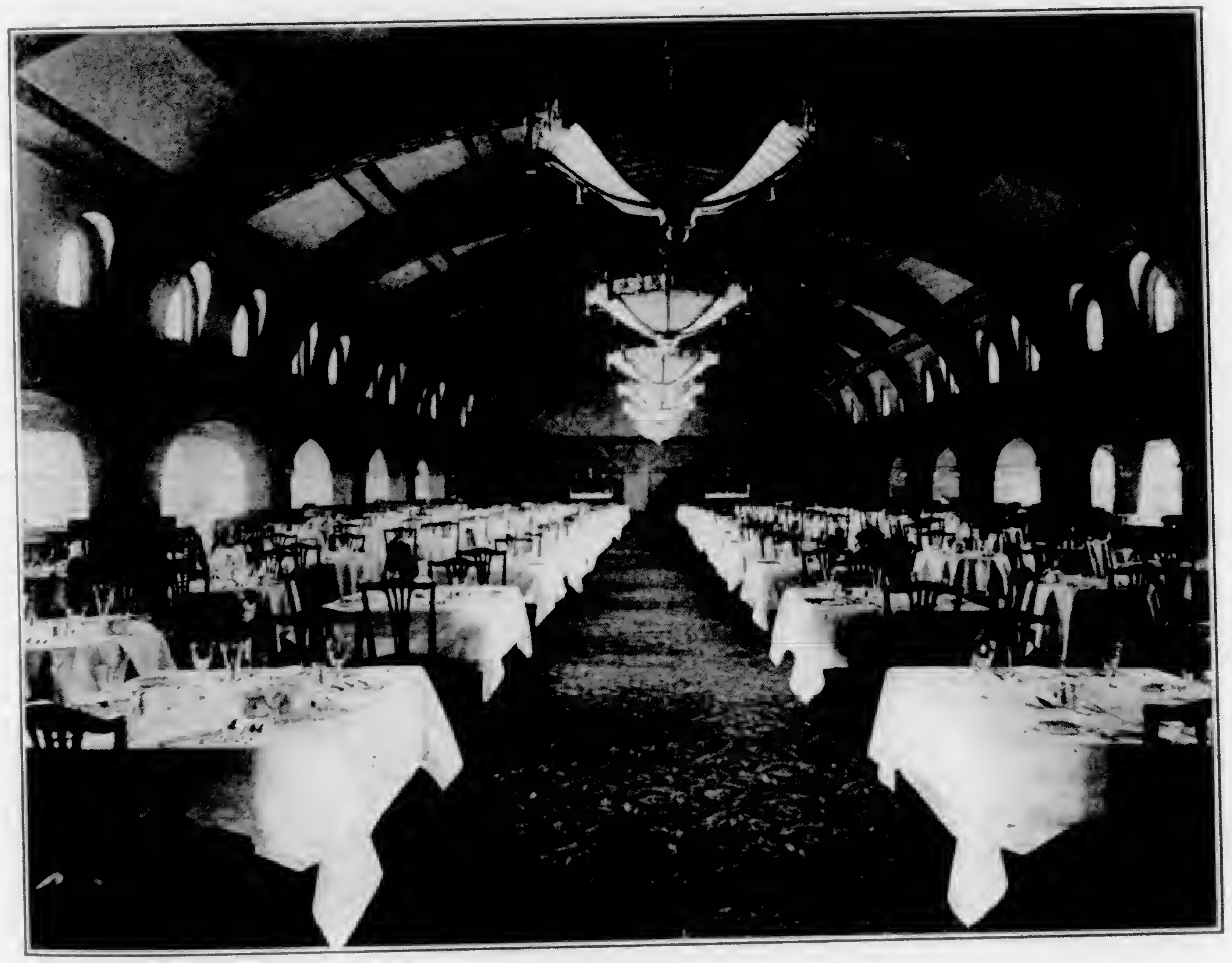
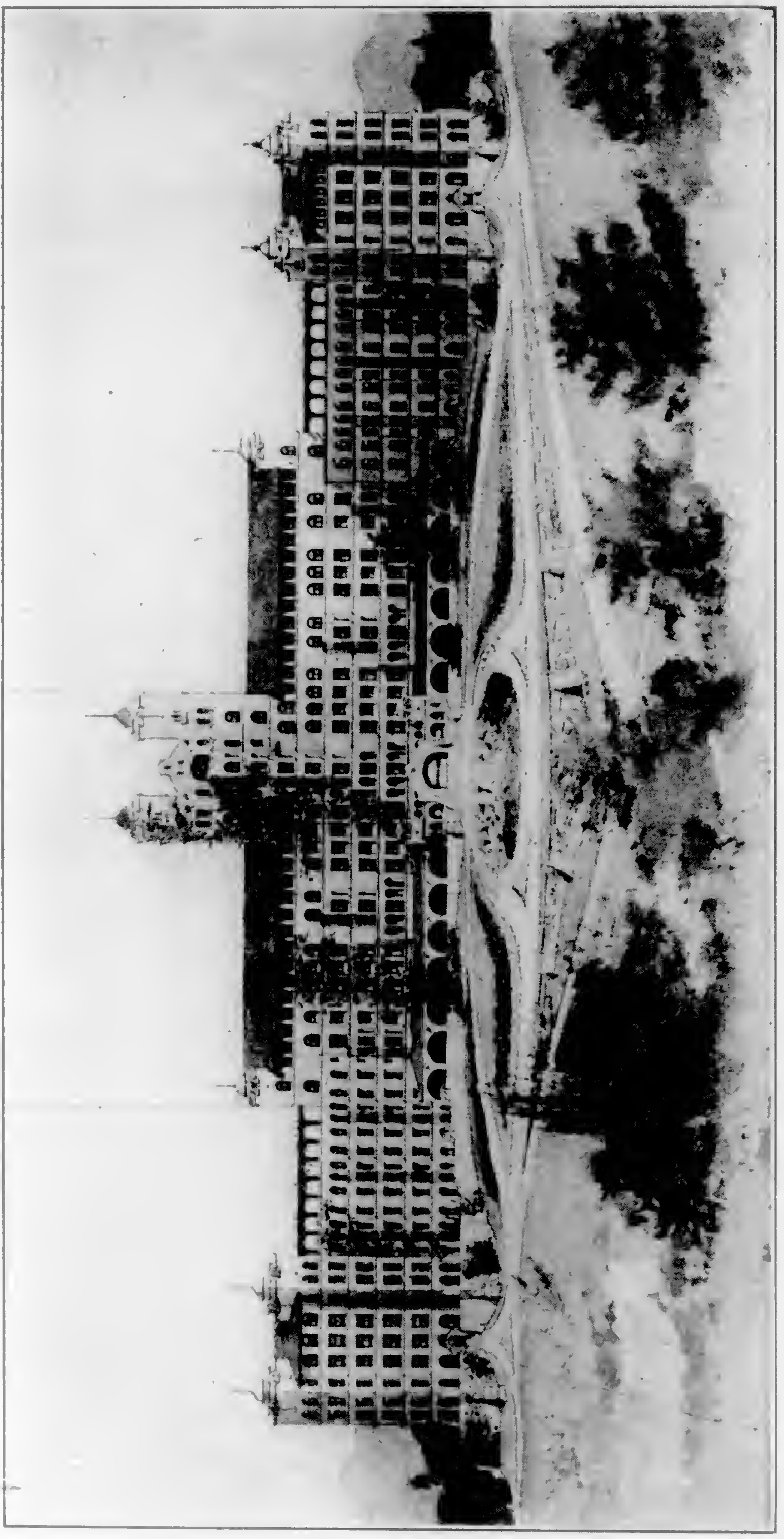


Dining Room. Haywards Hotel. Los Angeles
Chas. F. Whittlesey. Architect



Equipped with Otis Elevators

Hotel Wentworth, Pasadena

Chas. F. Whittlesey, Architect

buildings which have been erected of reinforced concrete in Europe and America within the last ten years, represent an aggregate expenditure of more than a hundred million dollars. About eleven million in the United States. The average cost per building is probably under fifty thousand dollars, at which figure the number of buildings would be 2200. There have been not to exceed six collapses of a serious nature and probably twenty more of slight consequence. This seems to me to be a very good showing, considering all the circumstances.

Never in all the records of the past has there been a failure of any reinforced concrete building in which the cause was not traceable to either faulty design, changing the placement of the reinforcing members on the work contrary to the drawings and calculations of the designer, removal of the forms before the concrete had properly set, depositing the concrete in freezing weather, or the use of poor cinders containing a large proportion of ashes in lieu of crushed rock for the concrete.

The author is unable to find any record of failure due to the use of bad cement or the failure in any building of a reinforced concrete column, for any cause.

The failures have always occurred before the building was finished and the Owner always has the assurance that if the building will stand the tests usually imposed before the work is accepted from the Contractor, it will continue to improve with age for many months.

We often hear the question, "Suppose you get a bad sack of cement into some vital part of the work. Would it not be fatal? This seems to be the popular idea of the danger that besets reinforced concrete construction. To those who are familiar with the methods of manufacture and testing in a modern, first-class Portland cement factory, such a probability is very remote. But granting that the tests at the factory and those made on the work are neglected and that a sack of really worthless cement has got into the mixer, the probability is that it will become so assimilated and diffused through the work that our factor of saftey would cover the deficiency. The most important element of danger is the disturbance of the concrete mixture after the initial set has taken place, through lack of rigidity in the form supports, causing vibration, or from wheeling barrows over the ends of the rods imbedded in the fresh concrete. This is a point on which workmen are most likely to be careless, and one which needs constant watching. In fact, the really essential things which the construction gang should know, are overlooked by careless workmen, because they are so extremely simple.

But the heavy buildings of the near future will be of reinforced concrete, and the form of construction, when done from the plans of competent architects, and designed by able engineers, will produce the greatest and most permanent revenue, cutting insurance, depreciation and repair bills to an amazingly low figure, while for residences, the qualities of fire protection and durability will overcome the small cost objection over flimsy wood construction.

* * *

Dead Black Stain for Wood

Apply a coat of hot logwood solution, allow it to dry, then apply a second coat; when this is dry, apply a solution of acetate of iron, made by dissolving iron filings in hot vinegar or acetic acid, which will turn the logwood stain dead black Let this dry, then rub with raw linseed oil to a dead polish.

A Monument to France

By F. W. FITZPATRICK, Architect

THE suggestion has been offered that this country erect some suitable monument to France or to the French people. It is a timely suggestion and deserves consideration.

In Washington there is a monument to Lafayette and one to Rochambeau; there is a Lafayette park and there is a plan afoot to erect some memorial to L'Enfant, to whose genius the city of Washington owes its beautiful plan. But all these tributes are to individuals who helped us to make history. So far we have done nothing really tangible to demonstrate our feelings toward the nation to which belonged those individuals and to whose friendship, recognition, moral, physical and financial support in our hour of need we are so deeply indebted. Indeed, it is not stretching the truth to state that it was to that nation's friendliness we must attribute in great part our existence as a powerful and independent nation today.

They say that republics are without gratitude. Is it not rather that the constant change of individuals in authority and the everlasting scramble for that authority merely make us forgetful of our social and sentimental obligations? Then, too, our national affairs are administered by so many almost independent branches, all infinitely more practical than sentimental, that those obligations are absolutely lost sight of and, not being the business of any one, remain undone. That our people are neither selfish nor ungrateful has too often been proven to warrant even an implication of the existence of those traits in our make-up, particularly vis-a-vis our friends, the people of France.

Up to the present, too, we have been so busy with things material, the upbuilding of the nation, the demanding and making of our place among peoples, populating the vast stretches of our country that there has been little time to think of the less practical duties and pleasures that are now receiving our attention. But we have grown to be a rich nation, a powerful one, and it is meet and right that we should devote time and funds to the embellishment of our cities, national luxuries, some of the pleasant things of life and to our obligations vis-a-vis those who endeavored to make the path of our infancy and adolescence less tortuous and thorny.

Our people's eyes are turned toward the city of Washington. It has been decided to make it a capital worthy of the nation and without peer among the greatest cities of the world. The President has appointed an Art Commission, a great plan of aggrandizement has been evolved and already we are at work erecting such buildings and making such improvements as funds become available and each detail conforming to that plan. The thing to do is for that Commission to take this matter in hand seriously and devise some suitable memorial to France, to decide where and how it shall be placed, and then to leave it to Congress or perhaps even more directly in the hands of the people to generously provide for the materialization of the idea.

We are tired in Washington of seeing bronze men on horseback, made to typify our every emotion and to commemorate the memory of our every hero, and it is to be hoped that the artists who may be placed in charge of this memorial may see fit to devise some other expression than the everlasting equestrian statue. Let us have a magnificent fountain so embellished with historical allegory and clearly inscribed text that the merest child may know and appreciate its purpose; or let it be a grand boulevard or avenue, or a park or a vast assembly or convention hall (of which Washington is sorely in need) but let it unmistakably and clearly enounce its purpose and its meaning, a tribute, an appreciation of our lasting and profound gratitude to all the people of the nation, to France!

Example of Glass Mosaic Work by H. R. Hopps of the United Glass Works for Grill Room in a Projected San Francisco Hotel

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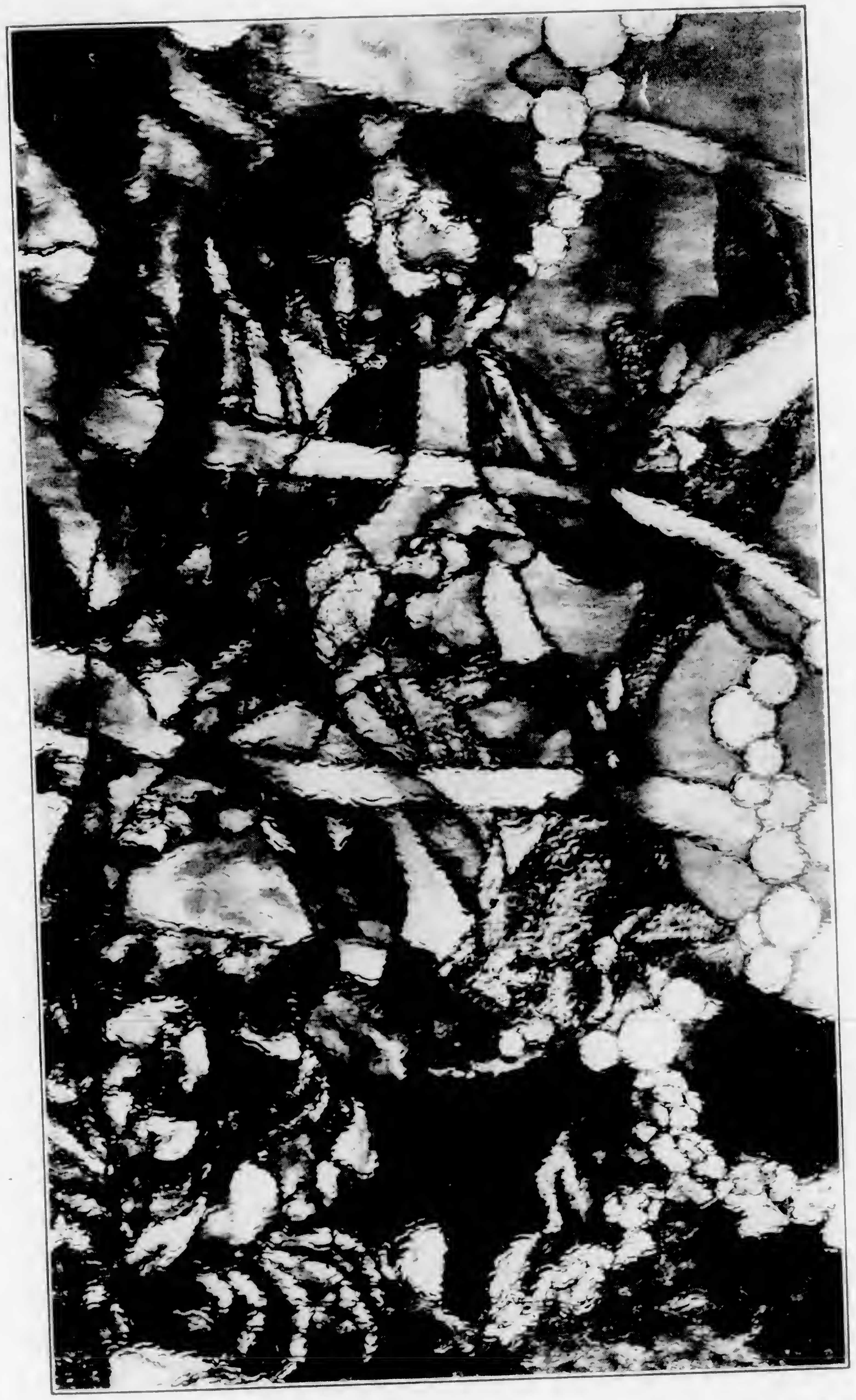


Example of Glass Mosaic Work by H. R. Hopps of the United Glass Works for Grill Room in a Projected San Francisco Hotel

Critical Reflections on Sand-Lime Brick

By DR. ERNEST HORSTMANN, M. E. and C. E.

IN AN illustrated pamphlet of a Californian Association of Manufacturers of Burned Clay Products, published for the purpose of advertising, whose objectivity I will leave undecided, reference is made as follows to an illustration of the text: ". . . . Effect of fire on sand-lime brick was the same as on any common lime mortar."

That means for everybody, who understands the purpose of this pretention properly, that sand-lime bricks are nothing else than hardened lime mortar, of the same kind as is being used for brick construction work.

The above mentioned assertion is made either against better knowledge or in absolute default of knowledge at all, a circumstance that may rest undecided just as well as the objectivity of the pamphlet which is pointed against all kinds of rivaling building material not being of burned clay. In the interests of the sand-lime brick industry I desire to flatly contradict this erroneous assertion.

I am entitled to claim for my dissertations, following below, the more objectivity, as from every standpoint, I am not "merely" a representative of the sand-lime brick industry, but also a representative of the entire ceramic industry, as well as of the cement and lime industry; my interests are consequently not partial but general.

However, if assertions are made from the one side without any proof which to deliver in this case is impossible in default of it, justice and fairness require the interests of the sand-lime brick industry to be protected just as good as the clay brick industry expects this for itself with a higher or lower degree of discretion.

Both, sand-lime brick and lime mortar (used for brick construction work, etc.) consist of a mixture of sand and lime. Whilst the proportion of the mixture of common mortar, in using fat lime, is 1:5 up to 1:6, in the proportion of the weight, it is only 1:13 up to 1:16 for mortar used for the manufacture of sand-lime brick.

That the mode of treatment of sand-lime brick mortar up to the fully prepared brick is to be quite different to that of common mortar follows with necessity of the facts mentioned above.

Mortar for brick construction work, etc. (henceforward called "Common Mortar") hardens in the open air, and under the influence of it, the hardening of sand-lime brick is done under the influence of moisture, heat and pressure, that is to say: by steam.

The hardening of common mortar is effected by carbonic acid, contained in the open air, by which the carbonic acid is connected with the lime which becomes stonehard. The lime added to the sand hardens by its transformation into lime carbonate and unites the sand grains into a strong bond, without changing the sand grain. To stretch the sand grains in such a net or texture of sufficient firmness it must have a certain strength, i. e., the surface of the section must be big enough to hold the texture together.

That conditions the great percentage of lime in proportion to the sand. As the sand does not change itself during the hardening, resp. is not submitted to chemical influences, its chemical qualities are less important, and therefore besides quartz sand other stuffs, for instance lime sands, slags, etc., may be used just as good.

Entirely different acts the lime during the hardening of sand-lime brick under the influence of steam (this character of hardening alone coming in question for the modern sand-lime brick industry).

In this the lime takes up no carbonic acid, but, forming a lime silicate, influences in a chemical way the silicic acid of the sand. Experience has taught that applying steam of 125 to 150 lbs. pressure the hardening is performed in about eight hours.

During the hardening by steam the sand grain changes. It forms on its surface a film of lime silicate, being grown together with it. The same is the case with sand grain lying adjoining, and the grains weld or grow together.

By atmospheric hardening, absorbing carbonic acid, there can merely be spoken of a liming or cementing together.

In a chemical process, as it is fulfilled by the hardening under steam, the qualities of sand and lime, naturally, play a very important role. The pure quartz sand together with the purest lime furnishes the best brick.

In easily disclosing sand, for instance sand containing feldspar or shale, 6 to 7 per cent of lime are chemically bound during the steam hardening, thus under circumstances the entire lime contained by the sand-lime brick mortar. In hard, and very difficultly disclosing sand only 2 to 3 per cent are bound under circumstances in the same hardening period, and yet, the brick has mostly the same strength, established in the fact that the hard, and difficultly disclosing sand proves to have a greater strength in itself. If there would be no difficulty to press bricks from such a meager and lime-impoverished mixture, being able to stand the steam hardening, one would be able to manufacture good sand-lime bricks of pure quartz sand and 2 to 3 per cent of its weight of lime. However, a mixture of such a low percentage of lime has very little binding strength and plasticity, and consequently a special and thorough working up is to be applied.

As is well known, carbonic acid influences under certain circumstances lime silicate connections and forms carbonic acid connections with the released lime, such connections proving to have a lower strength than the lime silicate connections. That would have as a consequence the disturbance of the structure of the lime silicate, because the present addition of the lime would be too small, still to form in connection with carbonic acid a texture strong enough for the cementing of the sand particles.

However, in this direction is nothing to be apprehended as carbonic acid only influences the lime silicate in case it appears in great quantities. Minor quantities of carbonic acid, as they occur in the atmosphere, do not influence the lime silicate, but the carbonic acid of the atmosphere will engage itself with the free lime not being bound in the brick after the steam hardening. This process is merely furthering the quality of the brick as there happens a slight after-hardening.

From the foregoing may follow sufficiently the deeply incised difference between lime mortar, used for brick construction work, etc., and sand-lime brick. Direct consequences of the difference are the high physical qualities of sand-lime brick contrary to the common mortar hardened in and under the influence of the open air, on which to base reflections I intend to do later in special essays.

Being especially important, today I announce only one of these qualities: The crushing-strength. On good sand-lime brick the crushing-strength shows in the average not less than 4000 lbs. per square inch.

The pronunciation of this one fact may alone be sufficient to qualify the "judgment" on sand-lime brick referred to in the beginning of this article to be absurd.

It is an incontestable fact that the degree of the fire resistance of sand-lime bricks depends on their crushing-strength. Just the same fact is valid for burned clay bricks.

The clay brick adherents cannot withdraw themselves from the fact that there are bad, even very bad burned clay bricks, and such bad and very bad clay bricks are also among the products of plant owners being members of the association coming in question in this article. And bad clay bricks are not better than bad sand-lime bricks. On the contrary. Good sand-lime bricks, however, are in all qualities to be taken in account, just as good as good burned clay bricks. This fact may be proved by competent demonstrations, and it is impossible to destroy it by pretending the contrary in a frivolous or malevolent manner. *Audiatur et altera pars.*

* * *

The Beaux Arts Exhibition a Success

AN ARCHITECTURAL exhibit of unusual interest has just been concluded in the Assembly room of the Merchant's Exchange, San Francisco.

This exhibit was specially interesting for two reasons. In the first place it was the first representative exhibit since the fire and in the second place it was of a purely commercial nature, showing actual buildings or schemes for contemplated buildings or structures under way. In other words, it differed from the usual exhibit in that the drawings shown represented current work. It is very rare that an exhibit of any size can thus represent actuality, but there has been so much work underway in San Francisco since the rebuilding of the city began, that this was made possible. The only trouble encountered arose from the fact that many of the buildings have been completed so rapidly that there exist no sketches of them.

The nucleus of the exhibit was moved over from the recent exhibit at the Home Club in Oakland. Mr. Polk and Burnham and Company had an extremely fine exhibit. Their drawings consisted of the First National Bank Building and some beautiful sketches of a Church at San Mateo, as well as other work. The University Buildings of Howard and Galloway, the Berkeley Town Hall of Bakewell and Brown, and the school buildings of Chas. W. Dickey are worthy of note as they show the advance made in public work in this locality and suggest a time when we will be able to point out our public buildings to the visitor with pride.

The Pacific Union Club Competition drawings of MacDonald and Applegarth were well presented and of special interest to the public. Bliss and Faville had on exhibit blue prints of beautifully drawn details of the Bank of California, while Howard and Galloway had a pen and ink perspective of the Italian American Bank. Tharp and Rixford exhibited a drawing of the Customs House competition. It is to be regretted that owing to delays in transportation this drawing arrived in Washington too late to compete. Clinton Day also exhibited Customs House drawings for the same competition. Woollett and Woollett had clever sketches of Eastern work. Reid Bros. exhibited some very good work. William Curlett exhibited the Head Building and the Phelan Building both of which were specially good.

There were many other interesting drawings in this division that were worthy of special mention and there were none that did not do credit to their authors and the exhibition.

In the Domestic division, Mullgardt, Hoover and Morgan, Osborn, Wm. Knowles, Bakewell and Brown, and Woollett and Woollett, were all represented by good work.

That of Mullgardt was especially remarkable. The landscape work of Lewis P. Hobart shown in this division was also very interesting.

Some Recent Tests of Portland Cement Mortars

By JOSEPH A. HOLMES,

Expert in charge of the Technologic Branch, U. S. Geological Survey

A BULLETIN has just been issued by the Technologic Branch of the United States Geological Survey on "Portland Cement Mortars and their Constituent Materials," giving the result of 25,000 tests at the Structural Materials Laboratories of the Government at St. Louis, Mo. The author of the bulletin is Richard L. Humphrey, engineer in charge of structural materials investigations.

The records reported are based on 25,000 tests extending over more than one year of active field and laboratory work. The report may be divided into two parts—the first, dealing with tensile, compressive and other tests, including chemical analyses of Portland cement of different brands donated for the purpose, and of the mortars mixed therewith in which a standard sand was used; the second, dealing with tests of mortars prepared by mixing typical Portland cement with 22 sands, 12 gravel screenings and 25 stone screenings, procured from different parts of the United States and mixed in different proportions.

In order that tests extending over a period of years might be made with a relatively uniform cement, a quantity of Portland cement of seven different brands was obtained by donation. An equal amount of each of these brands was mixed together to form a typical Portland cement, and the mixture was stored away in air-tight cans. Tests, made to determine the quality and variation of the typical Portland cement, were conducted in great detail both on the neat individual brands and the typical mix, and on 1.3 cement mortars made therefrom with standard sand.

The results of the tests showing variation in tensile strength with age of neat cement indicate clearly that the typical mix reached maximum tensile strength in 90 days, or at the same period at which this strength was reached by the separate brands; that it maintained the highest tensile strength for a period as long as that of the best of the individual brands, viz. to 180 days, and that the diminution in tensile strength thereafter to one year and beyond was less than for some brands and no greater than for the best.

The tests of the standard-sand mortars showed maximum strength of the mix at 90 days, or about the same as for the individual brands; more rapid falling off in tensile strength for the mix, up to 180 days than for the individual brands, but an actual gain in strength beyond the 180 days for the mix, as compared with a falling off of the separate brands.

In the compressive tests the typical mix showed a rapid rise in strength, as did the individual brands up to 90 days, and a less rapid but continual increase in compressive strength to the 360 day period for the mix as compared with some of the brands, four of which showed little or no gain in compressive strength after 180 days.

Compressive tests of the 1:3 standard-sand mortars showed a more rapid gain up to 180 days for the typical mix than for the separate cement brands, and continued increase in compressive strength beyond 180 days for the mix, as against a loss ratio of increase for several of the individual brands tested.

The general indications of these tests are that a better cement—that is one exhibiting greater uniformity of behavior—is likely to be procured by making a typical mix of several brands than by the use of any one standard brand of cement.

It should be borne in mind, however, that this statment is applicable only to the typical mixes used in these tests, and that it is possible that other mixtures of Portland cement might not yield the same result but would show entirely different characteristics. Results of further investigations along these lines will be reported as soon as they become available.

A study of the percentage of gain in strength exhibited by the various cements and cement mortars tested shows the very important fact that though the cements may test low or high at 7 days, and though there may be varying percentages of increase during the four periods from 7 days to one year, yet after the 180 day and the 360 day tests the strengths of all the standard-sand mortars were reasonably close one to another. This indicates that early strengths may vary considerably without seriously affecting the later strength of the cement or mortar.

The purpose of the investigations of the constituent materials of mortar was to ascertain as far as possible the properties of such materials collected in different parts of the United States. It is believed that the results of these tests, made on material obtained near the large commercial centers of the country will indicate clearly to users of cement and of concrete where they may most conveniently and cheaply procure the requisite sand, gravel, etc., and how these should be mixed to attain the best result in tensile or compressive strength for each group of constituent materials.

A study of the data in this part of the report should afford a means of determining the probable strength of mortar made from materials having similar properties, though gathered in different parts of the country, and should aid the constructor to decide which of three materials, sand, gravel, or broken stone screenings will best serve his purpose.

The tests whose results are here presented were made on mortars using different proportions of the typical Portland cement and sands, gravel screenings and stone screenings collected in various parts of the country, the properties of which are discussed in the earlier part of the bulletin. The report describes the material, the locality of its occurrence and the methods of screening, grading, etc., employed. The relative proportion of larger or smaller particles in the materials tested is not only described in detail and diagramatically, but is well illustrated by reproductions of photographs made to exact scale.

Considering these tests in respect to the percentage of voids it appears that the tensile strength decreases with the increase of void spaces. The strength of the mortars is invariably much greater when made from sands having a small percentage of voids than when made from sands having a large percentage. The strength of mortars of different proportions is also greater for those sands which have a small percentage of voids. This condition is the same in regard to both tensile strength and compressive strength, and indicates that the greatest strength can be obtained by the use of mortar in which the sand is uniformly graded. The same is true of tests of transverse strength, except that the difference is not so marked as in the tensile and compressive tests.

The tests show a greater uniformity in general when made at the end of 180 days than when made for shorter periods. The early strength appears to be easily affected by alteration in environment and the regularity in strength for the earlier periods appears to depend on the nature of the cement.

In tests of density of mortar, it appears that the density values are greatest for the least percentage of voids, and that the weight per cubic foot and the strength are greatest under the same conditions. In the tests of mortars made with gravel screenings only that material which passed a ¼-inch screen was used, and this amounted as a rule to less than 40 per cent of the sample received at the laboratory. As in the description of tests of mortars made with sand, complete details are given of the diameter of the particles in inches, with number of sieves passed; of the place in which samples were taken; and of physical and chemical tests. In these tests there is apparently a greater lack of uniformity in the increase of strength, probably owing to the physical differences in the gravel screenings. In general the tensile strength seems to increase with the decrease in percentage of voids. This is also true of the compressive strength. There was great irregularity in the results of tests on account of the difficulty in obtaining a thoroughly uniform mass, especially when the material was composed of coarse grains of approximately one size. In this case it invariably happened that the cement and gravel screenings occurred in many of the test pieces in streaks, the cement accumulating on one side of the neck of the test briquet, thus reducing the active section and possibly furnishing one element of weakness.

The tests of stone screenings collected in different parts of the country were made in the same manner as those described for sand and gravel screenings. Samples were also collected as described for the other tests. The results of these tests showed that in general the mortars made from screenings that are most nearly uniform in grading have greater strength than those made from the finer screenings, farthest removed from uniform grading. Also the strength of mortars made from the samples having a lower proportion of voids is greater than that of mortars made from screenings in which the voids are greater. This appears to be true also of the compressive tests, in which the strength of the mortar is greater for samples most uniform in grade. As shown by these tests the transverse strength does not vary much after 90 days. The tests indicate that no definite law can be given by means of which the strength of mortars made from stone screenings can be approximately foretold from the mechanical conditions, because the strength of the stone itself from which the screenings are derived has an important bearing on the strength of the resulting mortar. The same tendency was observed in the stone-screenings mortars as in the gravel-screenings mortars for the cement to concentrate at one or more parts of the test briquet sections.

This report is the second of a series now in process of publication by the Technologic Branch of the Geological Survey. It is preliminary to a group of reports which describe in detail the results of tests of various structural forms made of concrete and reinforced concrete at the Structural-Materials testing laboratories of the Survey at St. Louis. Bulletin No. 329, the first of this series, described in detail the organization, equipment and methods of test adopted at these laboratories. This second bulletin, as summarized above describes the investigations leading to the adoption of a typical Portland cement for testing purposes and the tests of mortars made by mixing sand and its substitutes, gravel and broken stone screenings with such typical cement, as an experimental study in the progress of the survey of the constituent materials of cement mortars and concrete in the United States.

A succeeding bulletin will describe tests of the solid stone from the same quarries as these from which were obtained the stone screenings on which the tests described in this report were made. These results may afford some basis for comparison of the relative values of mortars made from the stone screenings described in this bulletin. Other reports will deal with the results of tests of the constitutent materials of concrete as distinguished from those of mortars, and with the result of additional tests of the constituent materials of mortars. These papers will be followed by a preliminary report of the results of tests of plain concrete beams and of cement-mortar building blocks. The same constituent materials have also been assembled in the form of reinforced concrete beams, reinforced concrete slabs, and plain and reinforced concrete columns many tests on which have already been completed and the results are now in preparation for publication. Other reports in this series will include results of investigations of shear and the modulas of elasticity in tension and compression.

Parallel with this series of reports of the results of tests being made at the St. Louis laboratories there is to be published a report on the results of a series of tests made in the testing laboratories of various technological institutions. These tests were made in cooperation with the structural materials laboratories of the United States Geological Survey and the joint committee on concrete and reinforced concrete of the engineering societies.

* * *

Collapse of a Concrete Bridge at Gilroy

A REPORT of the failure of a concrete bridge near Gilroy, Cal., led the Architect and Engineer to make an investigation, the result of which, in our opinion, proved conclusively that design and execution were at fault rather than material: The structure was a mere culvert of about fourteen feet clear span and of approximately the dimensions shown in the accompanying sketch. Its length was about sixteen feet and its object was to provide a roadway over a small creek which runs through the town of Gilroy.

Work was begun on Monday, February 24th, and completed Wednesday, February 26th, there being but ten or twelve cubic yards in the entire job. The concrete was a mixture of cement and gravel, the latter being obtained from the bed of a nearby creek. The proportions used appear to be such as to produce a good concrete, although the specimens obtained were so green as to make a determination of its hardness impossible. It is believed, however, that there can be no complaint as to the quality of the concrete.

On Friday afternoon, two days after the last of the concrete was placed, a man, Hugh McConnell by name, was sent to strip the structure of timber forms, which were worth not more than five or six dollars. The bracing was 2 inch by 6 inch material, to which was nailed 1 inch by 12 inch lagging. In the interim between the completion of the pouring and the stripping of the concrete (two days) considerable rain fell, and the condition of the concrete can be well imagined. As soon as the braces were removed by Mr. McConnell, the green concrete was unable, with its small arch rise, to sustain its own weight and fell upon the man, crushing him to death.

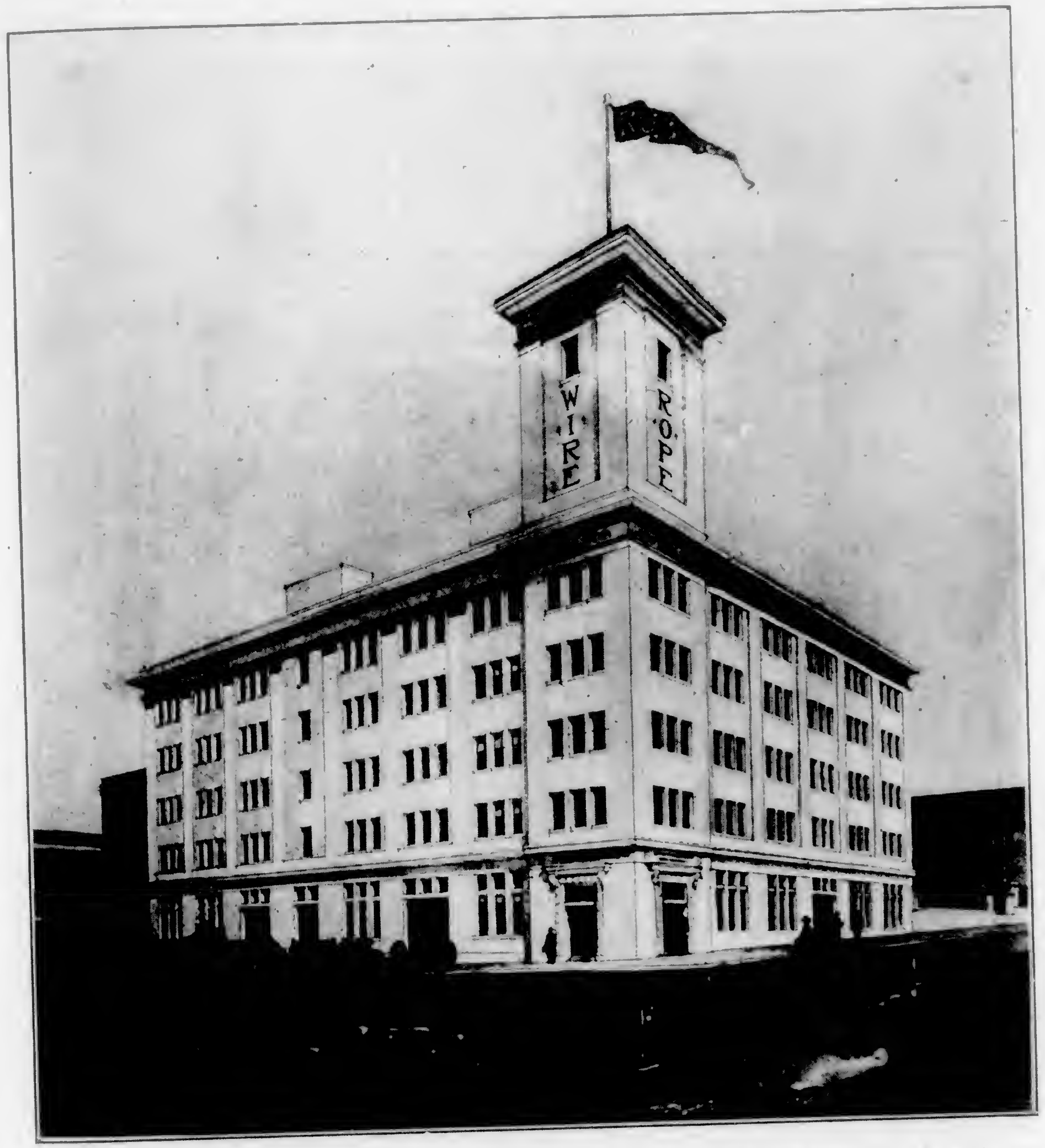
It seems deplorable that, for the sake of a few dollars worth of form work, such desperate and absolutely reckless chances should be taken, involving not only the bridge, which can be rebuilt, but sacrificing human life.

* * *

The ignorant are never defeated in any argument.

* * *

Be not lenient to your own faults; keep your pardon for others.



Reinforced Concrete Steel Frame Warehouse for the Roebling's Sons Company, San Francisco
Sutton and Weeks, Architects

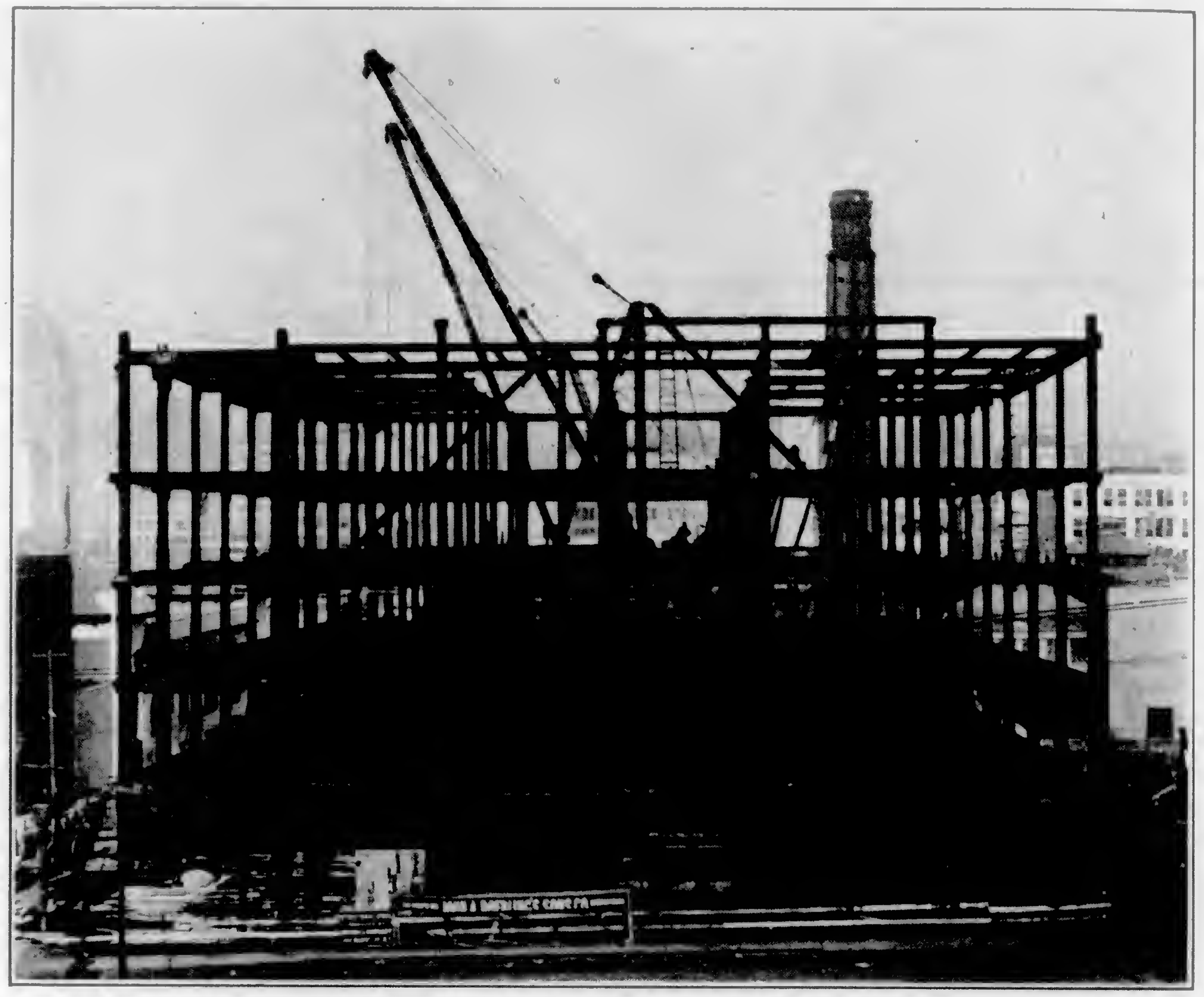
A Fire-Proof Warehouse

THE great warehouse now under construction on the northeast corner of Folsom and Hawthorne streets, San Francisco for the John A. Roebling's Sons Company is without doubt the most thoroughly fireproof and fire protected building in the West.

The foundations are I beam grillage, the frame of structural steel; the beam and column protection of concrete. The floors and walls are of reinforced concrete. The exterior is faced with white cement. Not a piece of unprotected wood is used in this building. The windows are metal with wire glass, automatic self closing. All inside doors and door and window casings are of metal.

In addition to this all exterior openings and openings to elevators are protected with rolling steel shutters which are automatic self closing.

A further protection against fire will be a complete system of automatic ceiling sprinklers and hydrants. An unique feature is the enclosing of all



Steel Frame of the Roebling's Sons Company Building, San Francisco
Woods and Huddart, Contractors *Sutton and Weeks, Architects*

sprinkler tanks (one 30,000 gallon and two 10,000 gallon) in a tower, instead of allowing them to be exposed and unsightly as is customary.

The general style of architecture in the detail of the exterior is Greek.

The building will be 112 feet, 6 inches by 150 feet by 72 feet high and top of the tower will be 115 feet above the sidewalk.

Sutton & Weeks are the architects and the steel frame, 1200 tons, was furnished by Levering & Garrigues Company, New York, who are represented here by Woods & Huddart, 356 Market street.

* * *

Prestidigitator—You saw me put your watch in your handkerchief?

Boy on Stage—Yes.

"You can feel it still in the handkerchief?"

"Yes."

"You can hear it ticking?"

"Yes, but—"

"Yes, but what?"

"My watch hasn't been going since I took the works out at school."—Punch.

* * *

Mr. Orthodoxer—But surely sir, Doctor Reglar doesn't advertise?

The Editor—Well, no, not directly, but when business is dull he often sends me a check for inserting pie and pastry recipes.—Lippincott's Magazine.

Steel vs. Concrete

THE merits of reinforced concrete construction as applied in modern building methods, were discussed at a lively meeting recently held by the Engineers and Architects' Association of Los Angeles. The speakers of the evening were Architects Alfred F. Rosenheim, John Parkinson and Arthur B. Benton, and Engineer A. C. Martin.

Mr. Rosenheim, vice-president of the association, was the first speaker. He introduced the subject as being one of vital interest to engineers and architects, inasmuch as the use of reinforced concrete is, comparatively speaking, of recent introduction in connection with the construction of buildings, and because it seems to possess an element of grave danger unless handled with extreme care and intelligence, even by men well fitted through training and education. He believed that it would be perfectly safe to venture the statement that we are practically all agreed that well-designed steel construction, properly protected and fire-proofed, for whatever purpose it may be utilized, is superior to any other method of construction that has yet been advised, and that it is the safest method because the calculation of stresses, strains, loads, etc., has been reduced to an exact scientific basis. He seriously doubted whether a similar assertion could be made with respect to reinforced concrete construction.

In order to explain his position he necessarily arranged the merits of the two methods under the following headings: 1. Cost. 2. Stability under normal conditions. 3. Stability under abnormal conditions.. 4. Term of service. 5. Adequacy against destruction by fire. 6. Favorable conditions for repairs or changes. 7. Liability of minor mistakes during the construction of the work, leading to dangerous failures. These questions were all answered in favor of steel construction.

In his address, Mr. Rosenheim was guided largely by the experience gained in the construction of the mammoth department store building of the Hamburger Realty & Trust Company, at Eighth and Broadway, Los Angeles, which, according to his figures, is the largest building west of Chicago, covering as it does a ground space of about 80,000 square feet and a total floor area of about thirteen acres. This building, with the exception of one portion, 55x162 feet, is of steel frame construction, with brick walls and concrete floors; the exception mentioned being of reinforced concrete. The construction features of the latter were ably explained by his engineer, A. C. Martin, with the aid of stereopticon slides.

Architect John Parkinson followed with a paper giving his views on the "mistaken ideas about the comparative value of steel and concrete." He said:

"Before comparing the costs of steel frame and reinforced concrete buildings, it may be well to go into the relative construction so as to judge upon the values in the two methods of construction.

"By a reinforced concrete building is meant a structure made of concrete with loose steel rods embedded therein, and so arranged as to form floors, beams, guides and columns. The steel rods are placed so as to take all forces of tension throughout the building. The concrete is so arranged as to take most of the compressive and shearing forces, and where the concrete is not of sufficient strength to take all the force, steel is added to take the balance. The connections of the various parts are all made by moulding the concrete by means of wood forms, into a monolithic structure and by tying the parts together with the rods. The absolute, necessary and essential features of the construction are those of the perfect bonding of the steel with the concrete and the complete embedding and protection of the steel by the concrete.

"By a steel building is meant a structure made up of rolled I beams and girders and riveted girders and columns. The arrangement and location of beams, girders and columns may be similar with that of the reinforced concrete building. The floor system may be exactly the same in all respects as that used in a reinforced concrete building. The steel beams, girders and columns being units of themselves, or riveted so as to make units, do not depend upon any mechanical bonding to insure their individual strength. The connections of the various parts are all made by means of steel connections riveted to the members with steel rivets. These connections are easily figured and absolutely positive in results. The essential feature of this type of construction is that the steel shall be so arranged that it will conveniently and economically carry the floors, walls, terra cotta or other exterior ornamentation and to allow being readily fire-proofed with concrete, brick or hollow tile.

"By comparing the two types we find that the reinforced concrete building has all its load-carrying members exposed to the action of fire, while the steel frame has all its load-carrying members carefully protected.

"The following is an extract of a letter from one of the leading engineers of building construction in the United States: 'I am convinced,' he says, 'that for structural purposes reinforced concrete is going to prove a failure, except in certain kinds of building. There is one thing that we have got to get out of our minds and that is that reinforced concrete is fireproof to the extent that it retains its strength after being subjected to fire, for this is not the case.

" 'A short time ago I witnessed a test made on concrete columns. Two columns were made two years ago, each of them twelve feet long. The columns were cut in two, making four columns six feet long. One of these was tested for compression and found to stand in the neighborhood of 140 tons for an actual area of 107 square inches, which, as you will see, gives an ultimate pressure per square inch of a load of 2300 pounds. One of the remaining six-foot sections was fire-proofed with ordinary four-inch fireproofing. The other two, together with the one fireproofed, were then put in a furnace and heated for three hours to a temperature between 1500 and 1600 degrees. Water was then applied to one of the piers not fireproofed, the other being left to cool off without the application of water. The next day we tested these two sections and found that the one fireproofed stood about the same per square inch as before it went into the furnace. The two pieces not fireproofed had lost practically all of their strength. When the testing machine registered a pressure of five tons these two sections began to crack, and at a total pressure of thirty-seven tons they gave way entirely. There was no difference between the sections to which water was applied and the other which was left to cool off without application of water. Now, if these columns had been part of a structure and this fire had occurred, I am almost certain that the structure would have collapsed under its own weight. I was personally very much surprised at the result, as I had been led to believe that concrete was a really fireproof material, so far as retaining its strength after being heated, but this idea I have had to give up. After what I know of this construction, I am more than ever convinced that it is not fit for structural purposes, except for very small buildings.'

"There are mistaken ideas in existence about the comparative value of reinforced concrete buildings and buildings of steel construction. We have often heard statements made to the effect that reinforced concrete buildings can be built for 30 per cent less than a steel building. While this might apply to a building which consisted merely of floors, outside walls and the roof with supporting columns, all in reinforced cencrete, it would not apply to an office building, hotel or any building of that class.

"The problem of low estimate is not how complete ~~and attractive~~ the building can be made, but how much can be left out. In our opinion a fireproof building can be erected, using steel frames, reinforced concrete floor slabs and walls, and fireproofing the columns with concrete and eliminating everything possible as is done in reinforced concrete buildings. This will result in a construction that will not exceed the cost of a straight reinforced concrete building eight per cent, and at the same time result in a safe and fireproof building and with a definite factor of safety.

"A reinforced concrete building is the best substitute we have for a steel building. While it will never equal a steel building, it has its uses. It approaches in merit a steel building in low buildings, but in office buildings of over five stories the extra cost of a steel building which may be at the most fifteen per cent is money well invested. We are stating what has been our experience.

"In the buildings with which we have been connected in this city, the cost of steel in proportion to the cost of the building was: In the Security building, 17 per cent; Central building, 22 per cent, both office buildings; Pacific Mutual Life building, 14 per cent; Chamber of Commerce, Pasadena, 22 per cent; Tehama building, 23 per cent; Norton building, 22 per cent; the two latter being heavy structures for store purposes; averaging 20 per cent. Taking these figures and allowing one-third for reinforcing bars, would bring the difference to about 13 per cent on steel alone. To this add 5 per cent for the difference in the quality and expense in placing the concrete, leaves a total difference in the most between a reinforced concrete and a steel structure of 8 per cent, which we believe to be an extreme limit."

* * *

Decoration

By W. W. TUCKER

"The Artistic is the Beautiful, Harmonious, Restful, and we must never forget that Beauty and Use are one."

HARMONY is the first thought in decoration. An artist studies personalities, choosing colors and designs suitable to the members of the household.

When decorating your home, study yourself. Select something complementary to you, choosing colors harmonizing with your temperament.

Rooms should be treated according to their situation, size, light, etc. Cold rooms may be given a warm appearance, dark rooms may be made light, small rooms large, low rooms high, and, in fact, any effect may be gained by proper treatment.

In planning your home, it is well to use the newer effects. Dining room walls, formerly in solid colors, may now be covered with durable leathers in bold designs. Self tones and stripes may be used in living rooms, tapestries in libraries, while reception rooms may be hung with the popular imported silk effects.

Today chamber decoration is at its best. The new crown effects and floral papers show a wealth of design.

In the bath room, tile papers have given place to the graceful sea gulls, the stately lotus, and the Arts and Crafts designs. These papers are sanitary and are not affected by moisture.

Interior of W. W. Tucker's Oakland Studio

Another View of the Tucker Studio

The Architecture of Mexico*

By W. GARDEN MITCHELL, ARCHITECT

The heart of Mexico is Mexico City, and the heart of the city is the cathedral fronting the "Zocola," or grand plaza. Built in the end of the sixteenth century and beginning of the seventeenth, it is large and in some sense imposing, but generally speaking it is ordinary. Its length is four hundred feet, width 177 and height from floor to roof 179 with towers something over 200 feet in height.

The "Segrario" to the east end of the cathedral, however, is more interesting and exhibits that highly decorated form of architecture in which the greater portion of the facade is so completely and elaborately carved, that pilasters, piers, niches, windows and doors, are involved in an intricacy that is completely bewildering, but distinctly fascinating and beautiful. This is of the middle of the eighteenth century. The facade of the churches of Gaudalupe and El Encino at Agua Caliente are also examples of this highly decorated style. The Encino is not so fine in detail but has a great deal of character and the movement of the lines of its sculpture are extremely interesting and I might say original.

One feature noticeable in the exterior design of these buildings is that the interest is frequently concentrated, say in an elaborate doorway which becomes accentuated the more simple the background is allowed to remain, also frequently at the sky line nothing of the nature of a cornice is introduced only a simple molding or coping, perhaps the line of the parapet is relieved by being curved upwards or downwards at intervals or in more fanciful sweeps or scrolls, such are frequently used on the gables of country churches but also on residences. The water spout, or gargoyle, also adds interest to the roof line, the gargoyles are Renaissance gargoyles, octagonal, round or square, projecting two or three feet and sometimes elaborately carved.

Towers and domes are common in Mexico. The most common form of tower is the campanile, rising two or three stories above the roof and surmounted by a small dome. In the church of San Domingo, Mexico City, the tower after rising in several stories of belfries is roofed more after the manner of a Gothic spire, only that the spire is much less elongated. It is covered with green, yellow and white tiles. At the various stages of the tower hang the bells, placed in the arched openings of the sides and balanced so that they can be revolved, boys do the ringing, and it is positively alarming to see these urchins standing within a few inches of certain death and catching the lever arm of the bell as they dash it round and round, while clang upon clang, sounds far and wide over the roof tops, and across the distant vega. No sooner has the deep basso of one bell died away than the shrill tones of another takes its place, and so to a third and fourth, in one alarming and wild carillo. This bell ringing of Mexico, which I call wild and alarming, is very unlike the sweet songs that hourly and half-hourly chime forth from the Halle tower of Belgium's picturesque City of Bruges, the one persuasive the other as a note of defiance and exhortation the war cry of alarm.

Domes are common to Mexico, chiefly in the churches, sometimes there is but one over the meeting of the cross, for the churches are, speaking generally, cruciform in plan, or parallelograms the transept being omitted in other cases groups of domes are to be found, over cross, side chapels, and so forth. These domes, however crude in finish, and often somewhat imperfect in shape are I might say always pleasing, they fit the building, and in materials (almost invariably of masonry, covered with tiles or stucco), harmonize with it. In the use of tiles the Spaniard gained great proficiency, and many of these domes, brilliant in orange, blue, white and green, and rising above their base of pale pink, opalescent-green and blue or cream white, and illuminated by that dazzling sunshine that floods the tableland of Mexico, fairly rival in color the brilliant hues of the surrounding foliage and none less brilliant azure of the sky.

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* Continuation of paper read before the San Francisco Architectural Club and Printed in the February Number of this Magazine

I can still recall a sunset on the domes of San Angel, a suburb of Mexico. The colors were as if a lapidary had mixed in a tray of turquois and gold, emeralds, opals and topaz, and in the yellow light of evening had flooded them with its golden beams. It was in architecture and nature what to Turner's imagination appeared the Queen of Venice, as with bellowing sail, radiant with every tint of evening, and stretching westward towards the sun, glides smoothly over a sea luminous with rose and gold. There in Mexico City over one hundred churches, any one of which would be considered good, did it belong to an American city.

Mexican architecture apparently often repeats itself yet it is never the same. An architect should not be afraid to repeat himself. It is better to acquire proficiency in one style, than to wade about from style to style seeking versatility, and mastering none, as we do in this country. The interior of many of these churches are frequently somewhat garish, I think they must have been redecorated at a later date than the good period of their building, on the other hand many of them are quite handsome and their altar pieces and screens, as illustrated in types such as San Domingo and La Regina, Mexico. El Carmen, San Luis Potosi, are unequalled anywhere in the world in extravagance and exquisiteness of carving. Sometimes these carvings cover the whole end wall of the transept, 40 feet wide by 50 feet high, and all save a few spaces left for paintings of Madonnas and Saints, are heavily carved and gilded. We have nothing at all equal to them in the United States, and I think only in Spain itself can be found any thing to compare to these wonderful gilded carvings. In reality the space is divided by pilasters and stories, but in the beholding, the multiplicity of the parts and the intricacy of the detail so combine that the impression is more that of an elaborate piece of lace work, or the intricate combinations of a Persian rug.

The interior architecture is generally on more conventional lines, Italian lines, pilasters, arches, entablature, and so forth, semicircular vaulted ceilings, with choir gallery at one end and high altar at the other. At Agua Caliente, there are a number of pleasing examples of decoration. The colors are green and gold and ivory, nothing else, except at altars or where a picture is hung or painted on the wall, no marbles are used and the floors are generally stone without design, the construction is stone finished internally with plaster.

The architectural period of Mexico was essentially a religious one, so that while in Mexico City, and some of the larger cities outside the capital, there are fine specimens of architecture in state palaces, libraries, museums, and so forth, these latter are few as compared to churches, and when we come to private palaces and mercantile buildings, examples of monumental character fall away rapidly, but whether the building be church or palace or the simple residence of the poor all are in good taste and suited to the necessities of the case. Of private palaces one of the most interesting is the House of Tile, the former residence of the Conde de-Orizaba.

(To be Continued.)

Among the Architects

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(ORGANIZED 1857)

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Architect M'Kim in a Sanitarium

Charles Follen McKim, founder of the firm of architects McKim, Mead & White, and former president of the American Institute of Architects, is reported in press dispatches to be ill in a private sanitarium not far from New York. He is suffering from a nervous complaint and heart affection, supposed to be the result of overwork.

Since the murder of Stanford White by Harry K. Thaw, Mr. McKim's nerves have not been of the strongest. The shock of his partner's violent death appeared to leave a lasting impression. Then, too, the loss of Mr. White from the firm caused more work to devolve upon the senior member.

Mr. McKim is one of the most widely known architects of this country. Although 61 he is still in the front rank of the active architects of note. Thirty-eight years ago he was graduated from the Beaux Arts of Paris and in 1872 began practice as an architect in New York. Five years later he was joined by William R. Mead, and a little later by Stanford White.

Mr. McKim in 1903 was awarded a gold medal by King Edward for his share in the promotion of architecture. Thoughout the country there stand magnificent buildings designed by the firm, of which Mr. McKim is the head. The recent alterations to the White House at Washington were designed under his direction.

Terra-Cotta Blocks in Los Angeles

The use of terra-cotta blocks for bearing and partition walls has finally received the approval of the Los Angeles council, and an ordinance regulating the same has been signed by Mayor Harper.

This important measure has been discussed on several occasions at the meetings of the Los Angeles chapter, A. I. A., and has received their endorsement. By this change in the building ordinances terra-cotta blocks may be used for bearing partitions in Class C. buildings, also for closets and vent shafts. They may be also used for bearing walls in buildings not exceeding four stories in height, if properly reinforced.

Mr. Frank A. Farnkopf
New President of Architectural Club

AS REPRESENTING one of the younger men in the architectural profession, who are coming into prominence, the portrait of Mr. Frank A. Farnkopf, printed on this page, will prove interesting to many, especially those who are interested in the welfare of the San Francisco Architectural Club, of which he is the newly elected president.

Mr. Farnkopf is planning an interesting year's work for the Club, not the least of which will be the Annual Exhibition of Architectural drawings to be held the latter part of September. It is his intention to make this year's exhibition not only an architecturally successful exhibit but to make of it a social feature; the opening evening to be devoted to the entertainment of invited guests.

It is also his intention to conduct an Atalier in connection with the present course of instruction, to be under the direction of a member of the Society of Beaux Arts.

Throop Institute Buildings

Architects Myron Hunt and Elmer Grey of Los Angeles have made plans for the proposed Throop Polytechnic Institute buildings, which are to be erected on the new site at the corner of California street and Wilson evenue, Pasadena.

Previous to commencing work on the plans Mr. Hunt spent several months in the East, visiting the various colleges and gathering data.

Of the schools visited, the University of Virginia was selected as having its grounds and buildings arranged in the most attractive and convenient manner. They were laid out by Thomas Jefferson, over a century ago, and have since been copied more or less in the new Medical School, at Harvard University, in the Washington University at St. Louis, in the Carnegie Technical Schools at Pittsburg, in Columbia University, the University of New York, Annapolis, West Point, and the University of Nevada.

The new site for Throop Institute includes in its topography almost exactly the same features which are prominent in Mr. Hunt's ideal college campus, the Thomas Jefferson campus of the University of Virginia.

On account of the break in the ground, the Administration building and library, which will be placed at the highest part, will be two stories in height at the front and three stories high at the rear. At the front will be an arcade, giving heavy shadows as one looks up the campus, and back of this will be the offices. At the east end, in a court between the two wings will be an audience room, a story and a half in height, to be used for commencement purposes.

Buildings for Arts and Belles Letters are placed on the right and left, respectively, as one turns through a recessed entrance. These buildings are relatively small, and are placed close to the campus.

Back of the Arts building on the south side of the campus is the Mechanical and Hydraulic Engineering Laboratory, with its long side next to California street. This building, in exterior appearance is the counterpart of the Electrical Engineering Laboratory across the campus with its long side along San Pasqual street.

Directly east of these buildings and northeast and southeast of the administration building respectively are placed the chemical, mining engineering and metalurgy building and the gymnasium. The mining and chemistry building is placed as it is so that the prevailing southwest winds may carry away the fumes. The gymnasium is placed across the street from Tournament park.

Back of these buildings are three dormitories in a semicircle, the convex side toward the Administration building, and at the extreme east end is placed the power house, with its chimney in the longitudinal axis of the grounds.

These buildings complete the whole scheme which will cost between two and three million dollars.

Science Church to Cost $100,000.

Plans are being considered by the trustees of the First Church of Christ, Scientist, of Pasadena, for the new edifice that they expect to build this year. The architects who have the work in charge, have nearly completed the plans. The new church will cost in the neighborhood of $100,000 .

Conditions in California

The following summary shows California conditions from January 29 to February 28, inclusive:

San Francisco building permits $2,331,987.

San Francisco building permits since the fire, $97,006,550.

Los Angeles building permits, $603,004.

Oakland building permits, $729,088.

Sacramento building permits, $55,035.

San Francisco real estate sales, 600; value, $1,675,000.

San Francisco bank clearings, $152,391,396.03.

San Francisco bank clearings, February, 1907, $234,771,422.05.

San Francisco bank clearings, February, 1906, $175,277,285.10.

Los Angeles bank clearings, $38, 979,724.

Oakland bank clearings, $5,889,670.10.

San Jose bank clearings, $1,815,618.62.

Sacramento bank clearings, $3,597,441.44.

Stockton bank clearings, $1,847,867.48.

San Francisco customs receipts, $553,593.73.

Oklahoma's New Club

At a recent meeting in Oklahoma City of a number of architects, contractors and machinery and building material supply men, from all parts of the State, the Builders Club was organized for the purpose of bringing about a better acquaintance among those associated with the building interests of Oklahoma.

One feature of the club will be the library to which building material and machinery firms are invited to send their catalogs, pamphlets etc., and the majority of the architects throughout the State have promised to send the club blue prints, specifications etc., when in need of bids or estimates.

A handsome suite of rooms has been furnished in the Martin building, and the Saturday noon luncheons are already one of the most popular features of the club. Over sixty members have been enrolled so far. F. E. Harkness is secretary.

May Send Delegates Abroad

At a recent meeting of Los Angeles Chapter, A. I. A., there was quite a lively discussion on the appointment of a delegate to the eighth annual Congress of Architects, which will meet at Vienna, Europe, May 18-24, inclusive. Each chapter of the American Institute of Architects is entitled to send one delegate. Los Angeles and San Francisco may each send a delegate. John A. Walls will probably represent the former city.

The choosing and awarding of prizes in the proposed competition of the Los Angeles Architectural Club was considered. The report of the committee of Los Angeles chapter, composed of Elmer Grey and Theo. A. Eisen, regarding a list of architectural books, treating various subjects from artistic gardening to the history of architecture, was submitted and the committee was reappointed to make the selection and attend to the awards.

Ten-Story Office Building

Los Angeles is to have still another skyscraper. Plans have been prepared by Architects Morgan and Walls for a ten story office building for Nelson Story to be erected at Broadway and Sixth streets.

The building will be constructed of brick, concrete and steel, and will be of the style known as Class A buildings. There will be ten stories above the street level, and a grand basement under the entire pile, with sub-basements for the power plants, vaults, etc.

Plans call for modern storerooms on the first floor, with an elegantly fitted restaurant in the basement. The upper floors will be divided into large, roomy, well-lighted offices, first-class in every respect, as the architects have made every effort to incorporate all of the latest conveniences and requirements of a modern building.

Enjoying Trip Abroad

George Alex Wright, senior member of the architectural firm of Wright, Rushforth & Cahill, 2277 California street, San Francisco, and before the fire associated with Willis Polk, now with the D. H. Burnham Company, is in Europe enjoying a well earned vacation. Mrs. Wright is with him and the two expect to visit Switzerland, Germany, France and in fact all the principal European countries before returning to America in May.

Starts on Four Months' Trip

John A. Walls, the junior member of the architectural firm of Morgan and Walls, Los Angeles, started recently on an extended trip which will cover a period of about four months. During his absence he will visit most of the European countries and the principal Eastern cities. As it is some years since he took a vacation of a similar character, he will no doubt be thoroughly interested in the scenes and building achievements of the old world.

Big Military Depot

Plans and specifications have been compiled in the quartermaster general's office, at Washington, for the extensive work which is contemplated at Fort Mason, near San Francisco, where there will be established a general military supply depot. Congress has authorized an expenditure of $1,500,000 for the construction of buildings and piers at that place. It will be the most important shipping point and troop transfer station in the country. Bids will be taken on this work up to May 4th.

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THE ARCHITECT AND THE CITY BEAUTIFUL

The movement toward "The City Beautiful" is taking firm root in the country and is spreading those roots in many directions. Washington, Cleveland, Chicago, New York, San Francisco, have felt its effects, but the smaller cities, too, should awaken to the possibilities of their situations and not imagine that it is essentially a large city affair. Every city of any importance that undertakes to do anything in that line today is confronted by almost appalling expenses and colossal mistakes that render the work a most serious proposition and one that requires years and much legislation and litigation and embarrassment for its successful accomplishment. Half the time is spent in correcting blunders that have been made years ago. The small town of today may be the city of tomorrow, and if that is kept well in mind much trouble and expense will be avoided to future generations. It's a comparatively easy matter, after all, for those interested in the small town to fix upon some general plan of development, a grouping of public buildings, a parking system and all that sort of thing early in the game. No expense need be put upon it but simply a scheme, a plan adopted. Then as each detail presents itself, a new building is required or money becomes available for parks, etc., it simply resolves itself into doing that particular piece of work in accordance with the plan already adopted, a sensible progression along a prearranged and intelligent system instead of slapping down buildings haphazard or making a park of some special politician's back yard, regardless of its adaptability.

But to accomplish this desired end, men who are versed in that sort of thing must necessarily take hold of it. It cannot be left to just the average citizen. He can furnish the support, the votes and the wherewithal, but the enthusiasm, the technical knowledge of what is what, the artistic inspiration, must come from elsewhere. The architects and the engineers of each locality are the men best fitted to cope with those problems. They are the ones to take the initiative, to arouse the enthusiasm in the project.

We would suggest, then, that the architects of every city and town on the Coast resolve themselves into local committees with this object in view. Let them map out, discuss and decide upon the local projects and the beautifying of their surroundings and then present their ideas to their fellow-citizens and assume the obligation of further devising and carrying out such adopted schemes and without cost to their respective communities. Then each one should become a special committee, whose business it is to see that his own work, the buildings entrusted to him by his fellow-citizens, conform as nearly as possible with the general plan adopted for the general improvements.

Architects as a rule are too self-contained and self-sufficient. True, they are very busy and so much of their work is of a personal character that the tendency is quite understandable. But, nevertheless and notwithstanding, they should get out more with the people, become greater factors in the social and communal life, be more public-spirited and take the initiative and burden of accomplishment in just such projects as this "City Beautiful" one. We bespeak their lively interest and zealous work in that line and promise them all the help and publicity and co-operation that it is within our power to give them.

STRIKES SEEM TO BE A THING OF THE PAST

The prices of materials have come down a bit and while labor is not much cheaper than in our recent flush times, it is steadier and one has a greater certainty of being able to get a building up and done with in peace and contentment and with small danger of strikes. All things considered, the heavier discounts given, more assiduous and interested labor, etc., etc., one can figure on building pretty nearly 10 per cent cheaper than he could last summer. Besides that, contractors are anxious to keep plants in operation and are satisfied with less profit than they used to exact, so that by careful figuring one may even do better than that 10 per cent reduction. People have grown tired of the usual gamble in stocks, they have seen so many collapses of over-inflated bubbles and have had the inside workings of so many great financial concerns laid bare before their disgusted gaze that men with money are prone to seek other investments than the speculative stocks. Building and real estate present attractive possibilities and greater certainty and it would not be a bit surprising to have 1908 that came in as a lamb go out as a lion, as far as building is concerned. Our building record for 1907 fell over $80,000,000 short of that of 1906. We hope and have some reasons to expect to see that of 1908 exceed that of 1906 by perhaps $80,000,000.

One very peculiar thing in the present situation is that in spite of all the talk of stringency and economizing, etc., there are more churches, Masonic halls and buildings of that character being erected than in any previous year. One would imagine that if a man had to economize anywhere, the first thing to be lopped off would be contributions toward church building and such purely social construction from which no revenue could be expected. That there has been an increase instead of a decrease in this kind of building certainly would indicate that people have ample confidence in the future and sufficient cash reserve, but feel a little timid about going into any business deals until things have become more settled. They have lost confidence in some of the great financial leaders, local and general, and until that confidence is restored or new men spring into power there will be a hesitancy in placing much money in commercial enterprises.

LIGHTING AND HEATING

As Applied to Buildings

Electric Heat Better Than Flame Heat

FLAME, as a direct source of heat, is at best a faulty servant. In consuming oxygen it produces carbon dioxide and other harmful gases; it wastefully warms huge volumes of inert nitrogen, with the result that temperatures are much reduced. If the fuel contains sulphur or phosphorus these much impair the quality of molten iron or seething steel. In dwellings, in mines, on shipboard, the necessary consumption of air is a dire evil; more serious still is the outpouring of deadly gases. Flame labors under other disadvantages. It is on the outside of a crucible or retort that it beats; the shell to be penetrated, if the steel plate of a big boiler, may be an inch thick; much thicker, and non-conducting as well, is the brick wall of a bake-oven. Flame produces much heat of little worth because of low temperature.

The whole Atlantic Ocean might be lukewarm and still leave a potato unboiled. It is the margin by which a temperature overtops the degree needed for boiling, melting or welding that decides its value. Yet more: flame at most has a play of only a few inches. Even when it raises steam, the best of all heat-carriers, that steam may be borne no further than a mile without excessive loss. All these faults and wastes disappear when, instead of flame, we employ electric heat, notwithstanding the cost of its roundabout production by a furnace, a heat-engine and a dynamo. In many cases the engineer can happily dispense with fuel altogether, and draw upon a waterfall, as notably as Niagara.

Electricity, in whatever mode produced, may be easily and fully insulated, taken, if we please 100 miles, and there, through non-conducting mica or asbestos, enter the very heart of a kettle, or still, to exert itself as heat, without an iota of subtraction. It has no partner, gaseous or other, to work injury or levy a tax. Electricity, too, by a transformer, may be readily lifted from low to high voltage, or pressure, immensely widening its effective play in soldering, welding, smelting. At any temperature desired, there, with perfect constancy, electric heat may be maintained, with no need that a branding or smoothing iron return periodically to a fire, with risk of scorching.—From "Electricity's Latest Triumphs," by George Iles, in the American Review of Reviews for January.

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What is Friction Tape?

SEVERAL recently received inquiries regarding friction tape would seem to lend interest to the following explanation from the Massachusetts Chemical Company, of Walpole, Mass., as to what this tape is:

Friction tape is so called from the fact that the fabric which is the basis of the tape is impregnated with insulating and preserving compound under great pressure, in other words it is "frictioned." This term is used by the operator for that particular step in the preparation of the tape. Many tapes are not "frictioned"; in other words, the compound is not driven into every pore of the fabric as it should be, and therefore they can not strictly be called friction tapes.

Some manufacturers claim that their tapes are "frictioned," but few tapes are really so treated as the process requires expensive machinery and considerable skill. In a measure the process is a trade secret which may be summed up by saying that the compounds are rubbed, or squeezed, or, in other words, frictioned into the cloth. The superiority of tape made by this process over simply a coated fabric is at once apparent. While tape seems like a little thing in electrical lines, it is a very important one, and should be made properly in order that it may do the work for which it is designed. Tape improperly "frictioned" will not resist weather conditions, will rot, will dry out in the roll and will not perform for any length of time the duties for which it is designed. Tape properly "frictioned" and impregnated with a compound properly made will last indefinitely either in the roll or on a piece of work.

Properly made tapes, when pulled off the roll, do not stick to your hands in hot weather, yet they have the highest degree of stickiness in cold weather. At

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the point where the tape separates on the roll from the layer directly underneath a series of small even teeth or strands of rubber may be noticed which break evenly as the tape is withdrawn and show the accuracy of the impregnation.

Electrical Kettles for Afternoon Tea

Electrical kettles for afternoon tea are said to be finding a sale in Shanghai; also electrical radiators in plain and ornamental styles, which are most useful in Shanghai during the damp weather, when a small and steady fire is needed for drying clothing, etc. The Shanghai municipal electrical department has a special low rate of charge for these heating appliances, and they are now being used in residences and offices in Shanghai.

A New Use for Electric Light

Deluding unsuspecting fowls into believing that it is broad daylight, and therefore time to be up and doing, is, according to the Bulletin of the New York Edison Company, one of the latest applications of electricity.

On the premises of Newmark & Werner, poultry dealers and shippers, 417 East 109th street, New York City, there is an installation of seven incandescent and three arc lamps, which illuminate a large interior yard where poultry are fed and fattened in their coops for the market.

At intervals during the night the lamps are turned on, flooding the yard with bright light. This wakes up the fowls, and leaving their perches they start feeding.

Newest Thing in Electric Signs

The newest thing in automatically operated electric signs, as told in the New York Sun, is a large sign advertising a preparation for removing spots from clothes. In this sign there appears outlined in electric lights a big bottle tipped partly over and under the mouth of the bottle thus tipped there appears at brief regular intervals a great irregular spot made with purple electric lights. When the big spot has thus appeared, there are seen to fall upon it, apparently from the open mouth of the bottle, drops of the magical cleaning fluid therein contained, this appearance of drops dropping from the bottle being produced of course by the turning on and off of single electric lights. As these magical drops fall upon the spot the spot disappears and in the place where the spot was are flashed in red lights the figures 23, Skiddoo! the spot has gone! And "if this isn't going some in the way of electric signs," says the Sun, "it is hard to imagine what would be."

The Manufacture of Electric Incandescent Lamps*

By GEORGE LORING

TO THE layman an incandescent lamp consists of a based bulb, enclosing a stem, with a filament mounted upon it. In discussing many of the operations necessary to bring about the above result, we will endeavor to consider them in the following order: Filament, stem and attaching the filament to same, making what is known as the mount, bulb, sealing the mount into the bulb, exhausting the lamp and basing.

BUILDING THE FILAMENTS

Cotton is placed in an acid, changing it into a mass form a trifle thicker than molasses. This is put into a bottle and forced in thread form through a small outlet in the bottom by air pressure from above, falling into a hardening mixture contained in a jar. After washing in water, to free it from acid, it is wound on drums and left to dry. While doing this, it shrinks to about one-third of its first size.

After being taken from the drums, it is gauged for size, wound on forms and placed in a graphite crucible. It is then

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*A paper read before the Ohio Society of Mechanical, Electrical and Steam Engineers.

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cooked at a very high temperature for a few hours, unpacked and gauged by resistance per inch, cut to proper lengths according to the voltage and candlepower for which it is intended, treated in a gasoline gas for resistance by apparatus which automatically cuts out when the correct point is reached, tested for spots, counted and packed into boxes ready to go to the mounting room.

THE STEM

A stem is made from a flange tube which is cut from a long one, previously sorted from others for diameter and thickness. This is necessary as the dimensions of the stem oftentimes vary with the size and style of the lamp into which it is going.

We will select one flange tube and follow it through the factory. It goes to a machine which automatically puts a flange upon it. It is then taken to another device in which it is placed flange up, the other end resting upon a block. Two leading-in wires, three inches or more in length, with platinum tips, are placed in the flange tube. The platinum end of each wire rests in a separate depression in the above-mentioned block. Gas flames are directed against the tube, covering the last quarter inch of the end which is not flanged. Jaws come up automatically and press this section of the tube together, sealing in the copper wires in such a way that the platinum starts about one-eighth of an inch from the end of the seal and protrudes for an equal distance; at the same time when an anchor is used, it is automatically inserted into the glass. The stem is then annealed, inspected for quality and, if satisfactory, is sorted into the proper stock division. If the stem has an anchor it is given to an operator who cuts it to the proper length and if necessary bends it at the ends.

THE MOUNT

The carbon is now mounted upon the stem, this being done by connecting the filament to the proper wire terminals or supports. A graphite and suitable

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binding material paste is used in this work. The mount is then straightened and inspected for every conceivable error. If satisfactory it is baked in an oven in order to make the joints absolutely secure.

THE BULB

The appearance of the bulb when received by the lamp manufacturer is an elongated glass tube larger at one end. Tissue paper surrounds it. This is removed and the bulb with others is placed in a tray, clamped down to hold it fast and submerged in a tank of water. After being thoroughly washed it is allowed to dry naturally, the time required being from twelve to eighteen hours. It is then moved to a machine where a hole is made in the center of the large end. This is accomplished by applying a pointed gas flame to that spot and sending an air pressure down through the neck.

What is known as the top tube is then joined to the bulb where the hole has been made. This is called the tubulating process. This tube is about 1⅞ inches in length and is cut with many others from a very long one in a separate department. The tubular bulb, neck down, is next placed in a blowing off machine which, by means of heat, cuts the neck to the proper length and with a pressure of air which is passed down through the tube and bulb makes a flare at the new end of the neck.

We are now ready to place the mount, which we left a few minutes ago, within the bulb and seal them together.

SEALING-IN

The mount is placed upon a machine and the bulb is set over it. The former is adjusted so that the flange on the stem properly meets the flare of the bulb. The stem and bulb in this position are put into what is known as the first fire to be warmed up. They then go into the final fire and the glass of the flange and the flare of the bulb are hermetically sealed together. The lamp is then removed from the machine and a pair of pliers is inserted into the stem centering the filament and forming a ridge on the outside of the seal, making it more secure and creating an anchorage for the cement used in basing. The lamp is now annealed and afterward inspected.

EXHAUSTING

Producing a vacuum within the lamp and sealing or tipping the tube through which the exhausting takes place is the next operation. First, the inside of the top tube is painted with a phosphorus preparation. The lamp is then heated in an extremely hot flame to drive the gas from its sides. Next it is connected with a preliminary pump and the air is fairly well exhausted. Following this it is attached to a second pump which has an ability to produce a higher vacuum and practically all the air is extracted.

While on the second pump the lamp is lighted. The pumps are next shut off and a gas flame is directed against the tube heating the phosphorous matter which gives off a gas which combines with the residual gases in the bulb, forming a solid precipitate so small that it cannot be seen; at the same time the exhaust tube is fused off a short distance below the bottom of the bulb, leaving the tip which we see on the majority of lamps, and the current is shut off the lamp.

The lamp is now inspected for spotted filament, vacuum, and all mechanical and electrical defects which could possibly have taken place up to this point. It is then ready for the photometer room, that is, to be tested to determine the voltage at which it will give the candlepower for which it was manufactured. Upon this being ascertained, it is placed in a tray with similar lamps and left in a certain section of the factory until the

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tray becomes full when it is put into stock. Ordinary two to twenty-four candle-power lamps are sorted fifty to a tray. With larger sizes there are naturally less.

When an order is received, lamps of proper candle-power, voltage, and current are taken from the stock room and again tested for vacuum. A felt washer and a license label are then placed in the stem. The former keeps the leading-in wires apart and also prevents cement from getting in. The lamps are once more tested for spots and for selection by being burned in series. This would readily show if any lamps had become mixed.

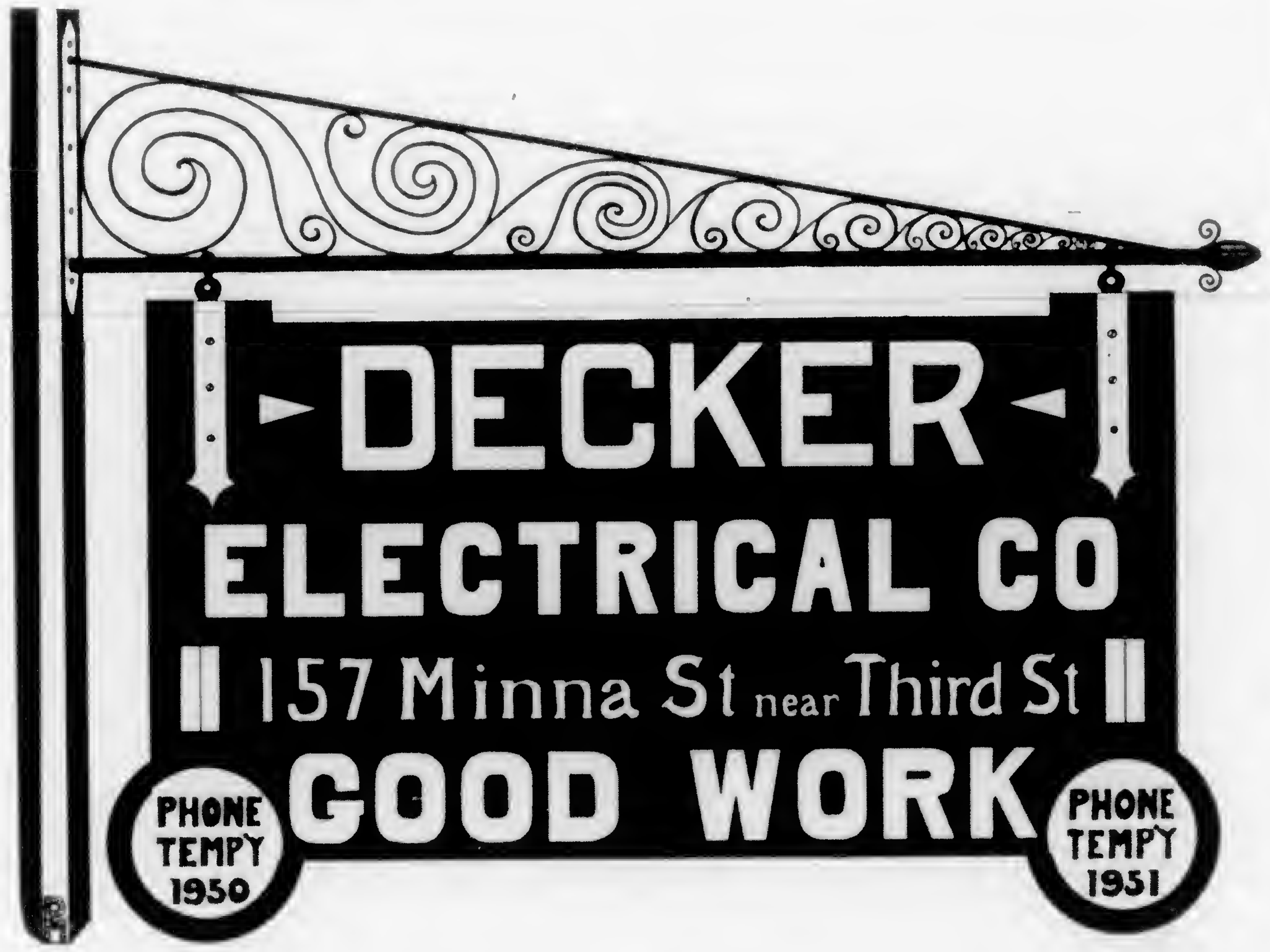
The next step is basing. A shellac cement is placed in the base which is put over the neck of the lamp, one of the leading-in wires coming out through the center of the tip of the base. The other wire protrudes between the lamp and the shell of the base. The lamp is then placed in an oven and its base is thoroughly baked. The leading-in wires are then soldered to the base and are trimmed and the lamp is cleaned by having the lower three-quarters of it placed in boiling water containing whiting. It is then dried with paper and the base is cleansed.

The lamp is next labeled, tested for vacuum, straight base, proper soldering, cleanliness, and all mechanical and electrical defects. If etching is desired it is done at this time. The lamp is also frosted at this stage, the label not having been put on. A standard package of 16-candle-power lamps consists of 250 packed in a case with five layers from top to bottom, 10 lamps on each layer from side to side and five lamps on each layer from end to end.

LEADING-IN WIRES

The leading-in wires of all lamps have a certain amount of platinum welded to the ends sealed within the stem. The platinum is cut automatically by machine. The wires are cut by hand. The copper is welded to the platinum, the former melting while the latter does not. Inspection takes place. The leading-in wires are then packed and are ready for use.

Sixty-eight people at least handle a carbon filament incandescent lamp while it is in the process of construction, no two people doing the same kind of work. This does not include the persons having charge of inspections, neither does it mean that only that number of operations are necessary. Some of the help take charge of a lamp while it is going through several steps in the course of completion.



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By the Way

Some Industrial Information Worth the While

Bass-Hueter Company's New Home

The Bass-Hueter paint company are now located in their new five story reinforced concrete building, 816 Mission street, near Fourth, San Francisco.

The company's new home is, without question, the finest in that line on the Pacific Coast. The upper floors of the old structure that formerly occupied the site were used for paint manufacturing purposes. After the fire the company erected a new paint plant on the block owned by Mr. Hueter and occupied by the San Francisco Pioneer Varnish Works. These combined plants represent a large investment, and are, with the building, at 816 Mission street as complete and up-to-date as modern experience can make them.

The business of the Bass-Hueter paint company has increased largely, and is steadily growing, in consequence of which it has become necessary for them to establish a Los Angeles branch, and build both in Seattle, Wash., and Portland, Ore., fireproof warehouses to enable them to distribute their manufactured products promptly from these points.

Their new paint factory is an example of a perfectly equipped modern plant, combining every new labor saving device, making it possible to produce a high grade of all manufactured products in the paint line at a minimum cost, an all-important matter in this day of keen competition and rapid advance in the science of paint manufacture.

The Bass-Hueter paint company act as the local distributors of Hueter's Superior Varnishes, recognized as the Pacific Coast standard, manufactured by the San Francisco Pioneer Varnish Works, and established in 1857.

Hueter's varnishes have been for many years, and are now, used exclusively by the Southern Pacific system, and also by nearly every electric car line on the coast. The leading architects acknowledge the fact that Hueter's Architectural varnishes, and House Finishing Specialties have no superior.

It is the intention of Manager James to extend to all architects an invitation to visit the new building and examine some new and beautiful specimens of finished woods.

A Successful Contractor

One of the largest and most successful contractors in Los Angeles is Weymouth Crowell, with offices in the Pacific building. Mr. Crowell's work speaks for itself. He has made a study of reinforced concrete construction and some of his best work has been with this kind of material. The great Auditorium building was built by Mr. Crowell from plans by Architect Whittlesey, also the Los Angeles crematory, the Chamber of Commerce building at Pasadena, a six story steel frame structure, the Angelus hotel which was the first seven story building erected in Los Angeles, the Hall of Records at Bakersfield, a reinforced concrete building now in process of construction and many smaller buildings, besides several handsome residences.

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The Dean Window

Although the Dean Reversible window has been manufactured in San Francisco for the past seven years there are many people who are not entirely familiar with its many advantages.

There are two styles of this window. One make, as used in the Pacific Building, does not require any weights and cord. The frame construction in this class of windows is very simple, the sash being pivoted at the sides in a weather-proof manner. For ventilating the sash is tipped at an angle keeping out the rain and when the window is to be cleaned it is simply turned inside out. These windows are made as large as 12 feet high and 12 feet wide.

The other style, or double hung window is hung on weights and cord precisely the same as any ordinary window. It is so arranged, however, that by merely pulling on the center rail of the window either sash can be turned inside out for cleaning or tipped for ventilation.

W. W. Tucker's New Store

Believing that wall papers can be seen to their best advantage where the surroundings are homelike. W. W. Tucker, well known Oakland decorator and painter, has furnished a store in the building at Fourteenth and Franklin streets with a reception and a drawing room where is shown the papers of the best American and European manufacturers. This department has been placed in charge of able wall paper men.

Mr. Tucker's painting and wood finishing departments have the reputation for doing the finest work on the coast, furniture refinishing being one of the firm's specialties.

Brick and Cement Coating

Although concrete has come into extended use as a building material, there has been more or less of a feeling of dissatisfaction which is due to its unattractive appearance and the inability to properly overcome this. Many expedients have been tried such as introducing coloring matter into the concrete while mixing, painting with linseed oil or some other substance after completion, but none of these have proved entirely successful. Therefore the claims of Wadsworth, Howland & Co., 82 and 84 Washington street, Boston, Mass., that their "Bay State Brick and Cement Coating" meets practically all requirements are particularly interesting. They state that their material, after being painted on the brick or concrete, becomes an integral part of the substance and not merely a skim coat which will peel or dust off. It can be applied to either dry or damp surfaces equally well and in any color without fear of change.

Asbestos Fireproof Plaster

The H. W. Johns-Manville Company are putting on the market a fireproof wall plaster under the name of "Asbestic." This compound is, with the exception of the binding material, composed of pure asbestos. It is absolutely fireproof and can be applied to any form of construction. The manufacturers claim it is lighter in weight, easier applied and will not decompose. It is further claimed to have unusual insulating and sound deadening properties. Its fire-resisting quality renders it particularly adaptable for interior plastering and exterior stucco. Many points in addition to those stated are clearly set forth in favor of this new plaster in an attractive booklet on "Asbestic," which can be obtained at any of the branch offices of the H. W. Johns-Manville Company.

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Move to New Quarters

Harron, Rickard & McCone, the well-known machinery merchants and heating and ventilating engineers, have moved from 436 Market street, across the street to the Sheldon building. Commodious offices have been especially fitted up for the firm on the third floor. The suite includes every convenience and is better adapted to the needs of this growing concern than the old quarters. Harron, Rickard & McCone were one of the first in their line to resume business after the fire and the hustling qualities of the management have been a factor in its present success. The concern are sole representatives in San Francisco and Los Angeles for the American Blower Company. It is their intention to go after the heating and ventilating end of the business with increased aggressiveness from this time on.

Moves to Monadnock Building

The Art Steel Ceiling Company, Inc., has moved to 273 Monadnock building, San Francisco, where Manager Chaffey has an elegant suite of offices. This firm carries a superior line of ornamental steel ceilings, also copper and brass covered doors and metal interior finish of all kinds. The old office was on Van Ness Avenue.

Sales Increase Since January 1st

Williams and Carter, the well-known San Francisco sales agents with offices at 197 Jessie street, report a steady increase in sales since the beginning of the year. This firm believes in the liberal use of printer's ink and includes in its advertiseing mediums the Architect and Engineer. The results have been most gratifying to the firm. Several splendid orders have lately been filled for the Durand steel lockers, both single and double tiers. They cost no more than a wooden locker and have the added advantage of being fire proof, theft proof and perfectly ventilated. They are as handsome as they are durable.

The Wallace-Lindsmith Hoists

On practically every concrete building of any size that has been erected on the Coast of recent date the Wallace-Lindsmith mixers and hoists have been used and they have given universal satisfaction. Contractors who have used them say they can't be beat. Architects do not hesitate to specify them. Various municipalities all over the country are passing ordinances forbidding the mixing of concrete except by practical and reliable machines. The result is that the machine mixer is today almost indispensable. The machines turned out by the Wallace-Lindsmith Company have been given several years trial and have been found to be one of the best articles of the kind on the market. The mixers and hoists are manufactured in Los Angeles. The Boyle-Luey Company are the San Francisco agents while F. T. Crowe and Co. cover the Washington and Oregon territory and J. Coughlin & Co., the British Columbia District.

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PNEUMATIC
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BENNETT'S NEW PROCESS PNEUMATIC EQUIPMENT

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Installed or in course of installation in the following San Francisco buildings: Main Telephone Bldg., Bush St.; Grand Hotel, Turk and Taylor; Aronson Bldg., Sutter St., between Kearny and Montgomery; Robins Hotel, Post St.; Williams Bdg., 3rd and Mission S. E. corner; Boyd Bldg., California and Drum; Hotel Arlington, Ellis and Leavenworth; The Luxor, Leavenworth St., between Pine and California; Mayer Bldg.; Imperial Hotel, San Jose.

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Manufacturing, Installing and Contracting Engineers

Owners of the Bennett Compressed Air and Auxiliary Steam Systems.

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Golden Gate Cement

The popularity of Golden Gate cement seems to be growing not only among contractors and builders but with the different houses which deal in cement products. In San Francisco there seems to be considerable good-natured rivalry in claiming the agency of this particular brand. The Holmes Lime Company have been made 1908 sales agents but this does not prevent the handling of the same goods by the Cowell Lime and Cement Company, the Western Lime and Cement Company and several other equally prominent agencies.

Back in San Francisco

The J. Llewellyn Company, well-known interior decorators, are again conveniently located in San Francisco. The store at 412 Kearny street has been nicely fitted up with a very select line of foreign and domestic wall papers besides a full line of W. P. Fuller's paints, oils, and varnishes. Something new in the decorative art is Decora, a sanitary wall covering that is all the rage just now in the East. It is used for covering the walls of kitchen and bath room and special pieces are made in soft wax colors for the den or office. Mr. Llewellyn has every confidence in the future of San Francisco, a fact that is only too apparent to those who have inspected his splendid Kearny street store. The Oakland branch will, of course, be retained.

Opens Los Angeles Office

The Williams and Carter Company, manufacturers' agents and whosesale dealers in building materials are now fully established in Los Angeles. They are exclusive representatives of a number of prominent Eastern firms and carry a large stock of goods for immediate delivery. Their Southern California representative is Mr. Sheldon T. Bent, with offices at 214 O. T. Johnson building.

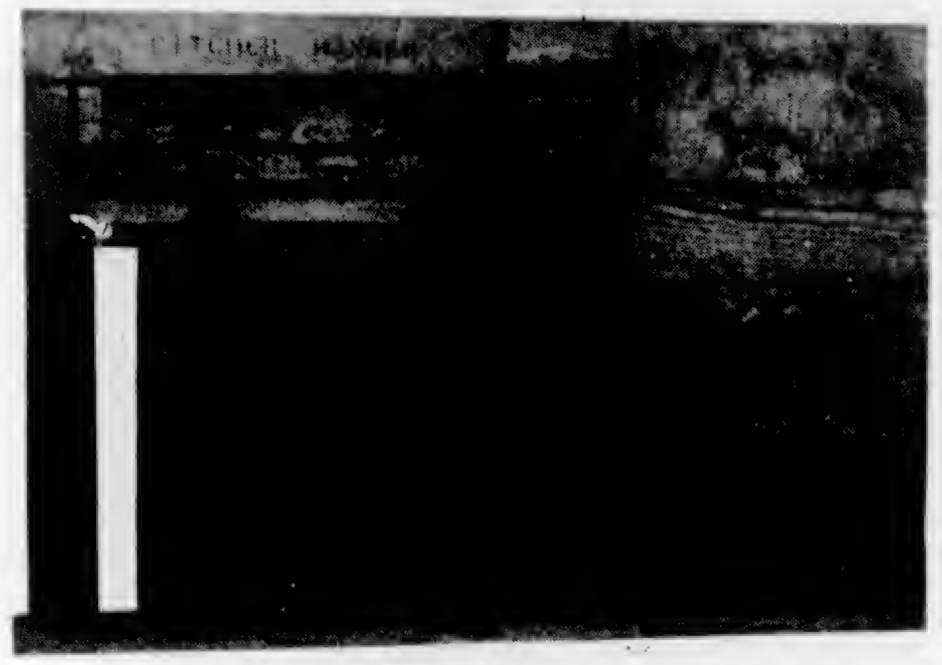
Architectural Modeler

Thomas Landy, whose advertisement appears elsewhere in this number of the Architect and Engineer, is turning out some very creditable ornamental plaster and cement work. Mr. Landy makes a specialty of interior work and several fine hotels and residences lately finished in San Francisco contain his modelings. Mr. Landy's work is clever and artistic. His studio is at 1673 Market street, at the junction of Valencia.

The Pittsburg Heater

Joseph Thieben & Company of 585 Mission street, have taken the agency for the famous Pittsburg water heater, and orders are coming in as fast as the goods can be shipped. This heater is without exception, one of the best now on the market. It is familiarly termed "The heater with the circulating thermostat." The Pittsburg will give you a hot bath for less than two cents and the water will be hot, too. It can easily be installed in any house without the necessity of changing pipes already in. The thermostat is a positive temperature regulator and with it all possibility of steam generation, with resultant injury to heater, house piping or enameled fixtures, is eliminated. Write to the San Francisco agents for illustrated booklet.

PHOTOGRAPH OF WINDOW MADE BY
Munich Art Glass Co.
510-512 TURK STREET
Phone, Franklin 1588 San Francisco



A Pitcher Door Hanger

A Popular Door Hanger

The above is from a photograph of a model of the Pitcher Sliding Door, a new device for hotels, apartment houses, flats and residences which is now being extensively used and specified by leading architects on the Coast. The doors slide instead of swing and fully 20 per cent in space is thereby saved. They can be placed in ordinary five and one half inch walls with four inch single studding. The hangers are made of all steel construction. They are manufactured by the Pacific tank company. For further information, price list, etc., send a postal to the Pacific Tank Company, 268 Market street or 231 Berry street, San Francisco.

United Glass Company

The United Glass Company has received the contract for making the handsome art glass dome for the reconstructed Hibernia Savings bank at Jones and Market streets, from plans by Architect Albert Pissis.

This concern is noted for originality of design and perfection of workmanship and Mr. Hopps, the manager, takes considerable pride in the fact that he was awarded a gold medal at the Paris exposition for superior workmanship.

Moves to More Central Quarters

The Western Builders Supply Company has leased part of the spacious store at 680 Mission street, near Third and has fitted up one of the most attractive offices and salesrooms in San Francisco. This company was one of the first to resume business after the fire, erecting a temporary building at Fourth and Natoma streets. Before the fire the firm occupied quarters on New Montgomery street. Its new home, therefore, is not very far from its old quarters. The Western Builders Supply Company is exclusive agent on the Pacific Coast of the International System of Reinforced Concrete. It also carries a complete line of interior wood finish specialities, Lane joist hanger, and enametile for bath rooms.

Fireproof Door Company

The California Fireproof Door Co. are furnishing the Wilcox Fire Door Hangers in connection with their improved metal covered doors. These hangers have been approved by the National Board of Fire Underwriters and have fusible links so placed that a fire, either inside or outside a building, will fuse them and close the door automatically by gravity.

A Handsome Hardwood Floor

The Acme Hardwood Floor Company of 136 Twelfth street, San Francisco, has recently laid a very handsome hardwood floor in a building in Santa Rosa for Victor Dunkerly. It is one of the best hardwood floor jobs done in that city since the earthquake and does great credit to the local firm and its efficient manager, Mr. I. K. Lerk.

Arthur Koppel Cars Running in San Francisco

Contractors have had a good opportunity to see the Koppel system of trains in practical operation in San Francisco the past few weeks. The block bounded by Eleventh and Twelfth avenues, Fulton and "C" streets, owned by Harrigan, Weidenmuller and Rosenstirn, is being filled in by the contractor, M. A. Greeley, who, to facilitate the work and permit of rapid progress, has installed a Koppel Portable Railway System. Prior to placing the system in use the work progressed slowly, but since the introduction of cars, rapid strides have been made. The trains make four round trips over the 840 feet of track every hour. The contractor has found that the system works wonders in hurrying the work and reducing his expenses. There is no system better than the Koppel and California contractors will eventually realize this.

Marble Entrances for the West Bank Building

The California Peerless Stone, Tile and Plaster Company which has one of the best imitation marbles on the market, has contracted to install the handsome marble wainscoting in the West Bank building, Chas. F. Whittlesey, architect. The material to be used is different from anything yet produced in this line and will undoubtedly prove a sensation. It is not only very beautiful, but permanent and fireproof. The company's factory is in San Leandro and its office is at 109 O'Farrell street, San Francisco.

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or
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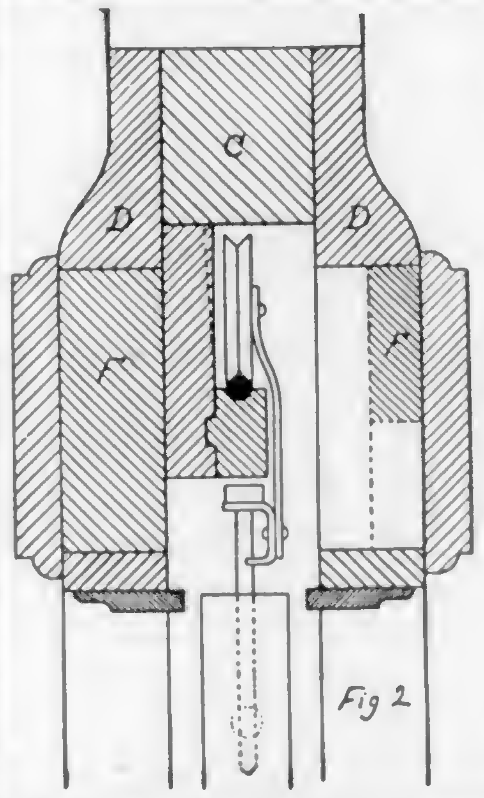
Local Steel Situation

The gravity of the situation among local structural iron workers and iron founders has reached a stage where drastic action must be taken to induce capitalists to refrain from sending to Eastern shops for structural iron work or allow San Francisco to face the inevitable result—the closing of the large iron works in the city and adding to the large number of unemployed skilled artisans who are daily tramping the streets in a fruitless search for work. Probably the most authoritative person on this subject is H. F. Davis, who has made an exhaustive investigation. Davis, who is secretary of the California Metal Trades Association, said:

"The policy pursued in sending East for iron material will have a reactionary effect which is already being felt. No single industry in San Francisco represents so much capital as the iron industry. In normal times 1000 men are employed in the metal trades alone. Today scarcely one-third that number are at work."

When asked what the result of this would be, Davis continued:

"It will mean the beginning of the end of home industry in the structural iron business. The only remedy will be an effort on the part of both labor and capital to cause this work to be left in the city, and with the co-operation of the labor press it will do the work. Let property owners and those putting up large buildings realize that their policy is proving suicidal to the interests of the city, and no more local work will go to help build up Eastern cities."



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Pitcher Sliding Door Hangers

are now being used in all parts of San Francisco and vicinity in apartment houses, hotels, flats and residences.

List of locations given on application. Work fully guaranteed.

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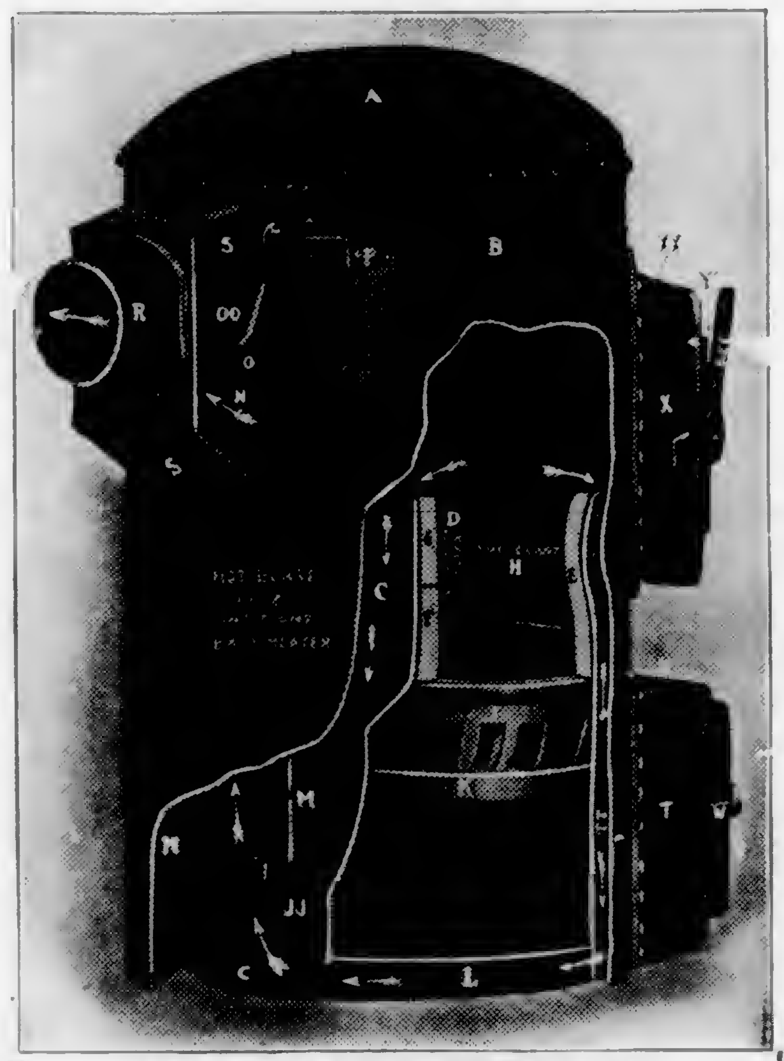

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REPRESENTING THE
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PATENT SIDEWALK LIGHTS
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Designs and Details of
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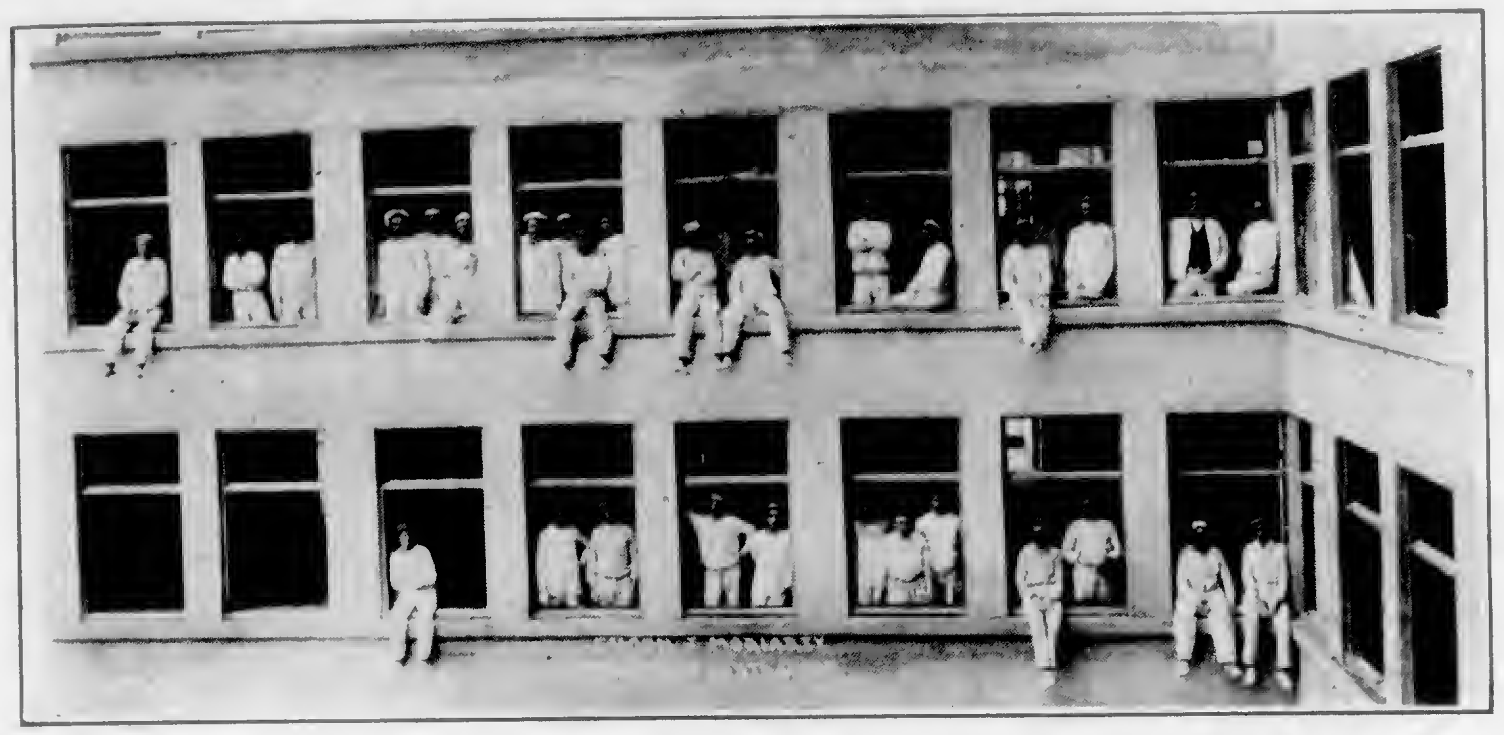

Plasterers Employed by Eugene J. Moriarty on the Pacific Building. San Francisco

Modern Vault, Floor and Skylight

John McGuigan & Company are sole agents in San Francisco of the Porcelite "Bar-Lock" wrought steel construction with "3"-Point Prisms or "Arch Plain" lights for vault lights, floor lights and skylights. In the construction of modern buildings, especially large structures, the aim of architect and owner is to utilize all available space and put it to profitable account. Cellars, vaults, engine rooms and below surface apartments which require light, are effectively supplied by Point Prisms. Porcelite "Bar-Lock" wrought-steel construction and "3"-Point Prisms. Porcelite "Bar-Lock" excels all others; it combines strength and compactness; it provides a maximum glass area; prevents rust and gives more light and with "3"-Point Prisms or "Arch Plain" lights, it becomes an absolutely water-tight, illuminating pavement, floor or skylight.

It is adapted to all structures, shapes and peculiar angles and has been approved and specified by the most experienced architects, engineers and contractors in the United States and foreign countries.

The John McGuigan Company is installing these prisms in a number of San Francisco buildings and architects who have not used them would do well to investigate. Mr. McGuigan will be pleased to supply detailed information, price list, etc. The company's factory is at 280 Seventh street, San Francisco.

Adams & Hollopeter Move to New Quarters

The Architect and Engineer is glad to announce the removal of Adams & Hollopeter to new quarters at 745 Mission street.

Since establishing their business in San Francisco two years ago this firm has shown their ability not only to do strictly high-grade lighting fixture work but to do it promptly. As a consequence they have acquired the confidence of all the architects and other buyers of lighting fixtures from whom they have received orders. They have shown a commendable purpose in working up an individual line of fixtures, handling goods of their own manufacture exclusively. In their new quarters, not only will they be in the natural center of the lighting fixture trade in San Francisco, but they will have ample room for display, which was lacking at their former quarters at 1882 Market street. Their factory will remain at the old location.

Will do Concrete Work

The Ransome Concrete Company, Crocker building, San Francisco, has been given the contract for all of the concrete work of the reinforced concrete building now under construction at Martinez, California, by the First National Bank of Martinez.

The Electrical Installation of the Pacific Building

Probably the most novel feature about the electrical installation of the Pacific building is the ingenious method of running the branch circuit conduits and wires. There are no ceiling lights in the offices of this building; all of the illumination is obtained by brackets, four in each room. All branch circuit conduits are run vertically from an outlet of one floor to the one directly above it or below it, in this way eliminating horizontal runs. The outlet boxes are not of the ordinary type, but consist of a heavy iron ring about four inches in diameter, which is equivalent to a box of the usual type without a bottom to it. A special lug is provided for fastening the fixtures. The rings are placed in the room partition and the open ends serve as outlets for the wires in the two rooms that are separated by this partition. In this way a great sav ing is made in boxes and labor in installing the same.

There are six panel boards in the entire office part of the building, each having a capacity of about 50 circuits and placed on the fourth floor. The horizontal pipes connecting the vertical pipes with the different panel boards are run in the fifth floor slab. Each panel board is provided with a separate feeder. The hall lights are controlled by means of two distinct sets of feeders connected in the usual way.

For connecting portable desk lights a receptacle is provided in the canopy of the bracket fixture in which is inserted a plug with flexible cord.

There are about 8000 lights in this building, also six 35 horse-power electric elevators with motors and controllers on the pent house floor. A complete telephone and messenger system is installed. The contract covering this work was performed by the Butte Engineering and Electric Company.

Wanted—About 2500 or 3000 feet of floor space for Light Manufacturing—or will rent ground space and put up building. Rent in any event must be very low and location in business district. If above ground floor must have freight elevator service. Address, write full details: K. E. Williams, care Architect and Engineer, 621 Monadnock building.

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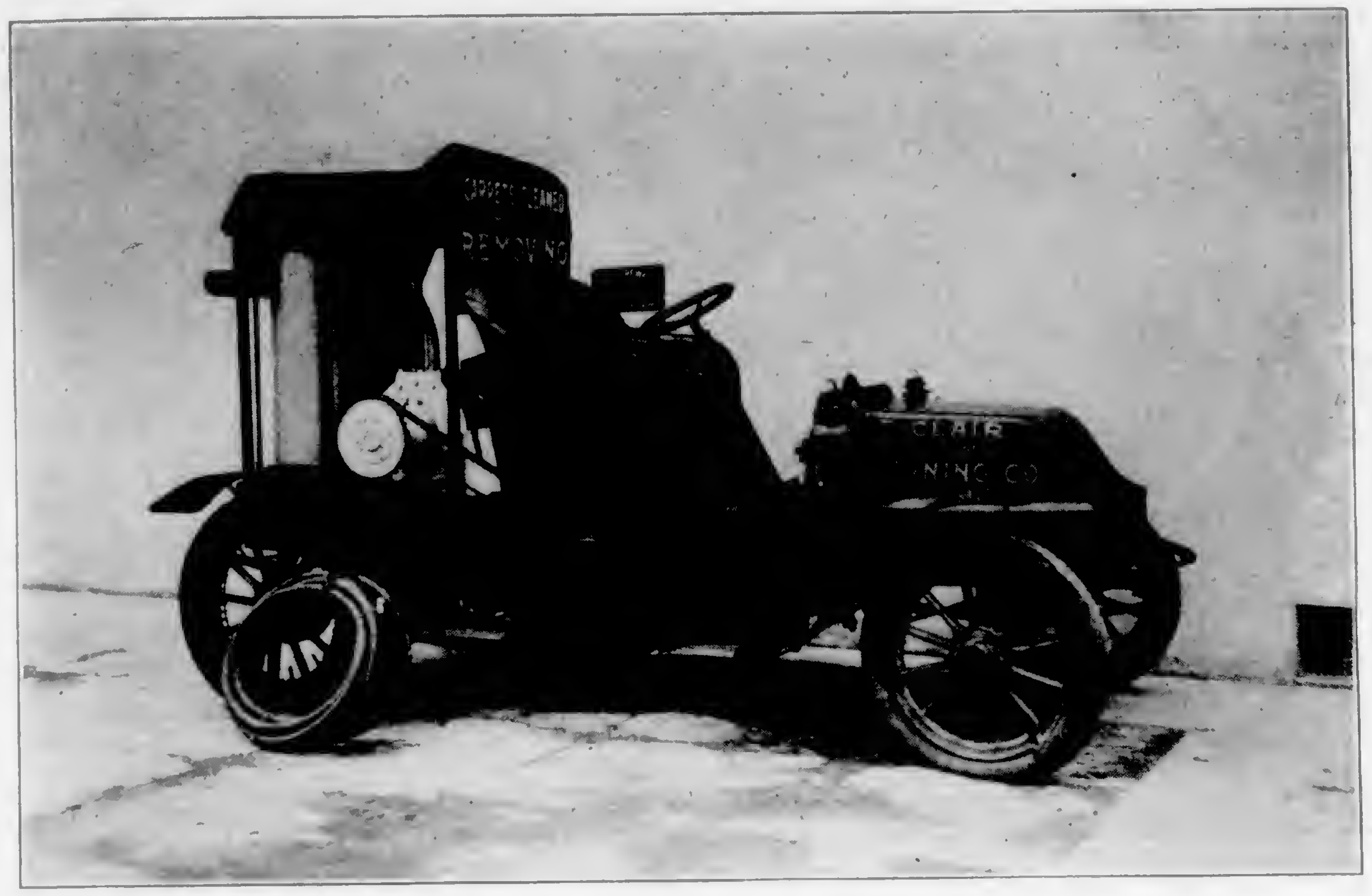

This Two-Lunger Cleans Carpets

It Never Wears Out

The Winton never wears out—and it's never done working. If you don't need it for pleasure it will earn you a comfortable living in its old age.

As proof of this note the illustration above. Carpet cleaning by automobile power is a novelty to be sure, but these are days when the successful business man is in search of novelties. The contrivance shown above is the result of the enterprise of the Le Clair Vacuum Cleaning Co. of San Francisco and the efficiency of the 1904 two-cylinder Winton that has been pressed into service. The illustration tells the whole story. The Le Clair Company declares its experiment is a thorough success.

Sing Fat Company

Sing Fat Co., Inc., formerly of 614 Dupont St., next to St. Mary's Church, San Francisco, have the pleasure of announcing to their friends and old customers that they are now going to occupy one of the largest and handsomest Pagoda buildings in Chinatown, southwest corner of California and Dupont Sts.

Being the oldest firm in this line, and with the enormous floor space, are now in a position to exhibit their complete line of Chinese, Japanese and Oriental Goods.

It would be impossible to mention the numerous articles that will interest both local and tourist customers. Therefore they extend a most cordial invitation to visit their new store where no effort will be spared in showing you around and making you feel at home.

Fixing the Blame at Quebec

The royal commission appointed last fall to investigate the causes that led to the collapse of the unfinished cantilever bridge at Quebec last August, by which some seventy lives were lost, has made its report to the dominion parliament. The designing engineer of one company engaged in building the bridge and the consulting engineer of the other are charged directly with responsibility for the frightful accident. "The ability of the two engineers," says the commission, "was tried in one of the most difficult professional problems of the day, and proved to be insufficient for the task."

There is no beating about the bush. The investigators have done the duty assigned them and are brief and direct in their findings. If the engineers have a defense and care to make it public, here is the definite charge to answer. The commission declares that the material used in the bridge was good and the construction work beyond criticism; the defects "were fundamental errors in design." The only criticism of the owners of the bridge is that they should have exercised more judgment in choosing an experienced man for chief engineer. The cause of the accident, until now clouded in doubt, is held to be "the failure of the lower chords (compression member) in the anchor arm near the main pier."

Now that a commission, whose fairness and thoroughness cannot be questioned has reported that the Quebec bridge need not have fallen, had a heavier type of construction for compression members been adopted, confidence in all other such structures, existent, now building and to come, will be restored.

Concrete Blocks and Cement Brick

Secretary Petersen of the New Era Pressed Stone Company, with offices in the Pacific building, San Francisco, writes as follows:

"I am pleased to have this opportunity of placing the products of our new industry before you for your valued consideration. I say new industry, because it is one which has never been extensively carried out in this vicinity.

"I can positively state that after a careful study of the concrete block and cement brick ideas, we did not hesitate long in accepting it as a good proposition. We have, however, hesitated somewhat, in agreeing to accept concrete blocks as at present manufactured in a great many instances. We contend that it is absolutely essential that the old saying, 'Honesty is the best policy,' be carefully adhered to.

"Our plants will be conducted by experts and as we intend to comply with the aforementioned policy, our patrons will be assured of only first-class building materials.

"Cement blocks and brick can be made of different grades varying with the density, texture and finish, and can very readily replace natural stone and clay brick in all classes of buildings.

"The materials used in the manufacture of cement products must of a necessity be A No. 1 in every respect. The sand must be clean and the cement must be of a good quality. We have on numerous occasions come in contact with blocks and brick that have been made of dirty sand.

"We deem it justifiable to criticise some of the work we have seen in the past and hope to have the pleasure of demonstrating to all interested parties that a concrete block or cement brick are equivalent in every respect to natural stone or clay brick."

Revolving Door to Go

A dispatch from Cleveland, O., says:

"Amendments to the building code suggested by the Collinwood disaster will be talked over at a special meeting of the council building code committee.

"The meting was called by Chairman Pfahl after a conference with Building Inspector Lougee. Pfahl says an ordinance will be introduced to prohibit the placing of revolving doors at the entrance to buildings."

It has been found that revolving doors are especially dangerous in case of a crush of people, as the openings become choked up with exciting individuals and the doors cannot be moved either way. The result is that those inside are penned in like so many sheep.

J. G. BRAUN
537-541 W. 35th Street, NEW YORK
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Plain and Ornamental Sash Bars, Leaves, Rosettes, Pickets and Ornamental Rivets, Square Root Angle Iron from ⅜"x⅜"x1-16" Upwards.
Square Tubing for Elevators. Elevator Enclosures and Office Railings
Catalogue to Architects, Architectural Iron Works and Builders only on Application.
Patent Sheet Metal Shears
Punching Machines
All parts, including the main body, are made of forged steel which makes these tools far superior to any made from cast steel.
The Punch Machines are made from steel plates. All movable parts are steel forgings. All parts which can be are tempered. The Eccentric pillar blocks are made with independent steel rings. Some of these Machines also have Shears for cutting Angle, Tee or Flat Iron.
WRITE FOR CATALOGUE AND PRICES
OVER 600. MACHINES SOLD

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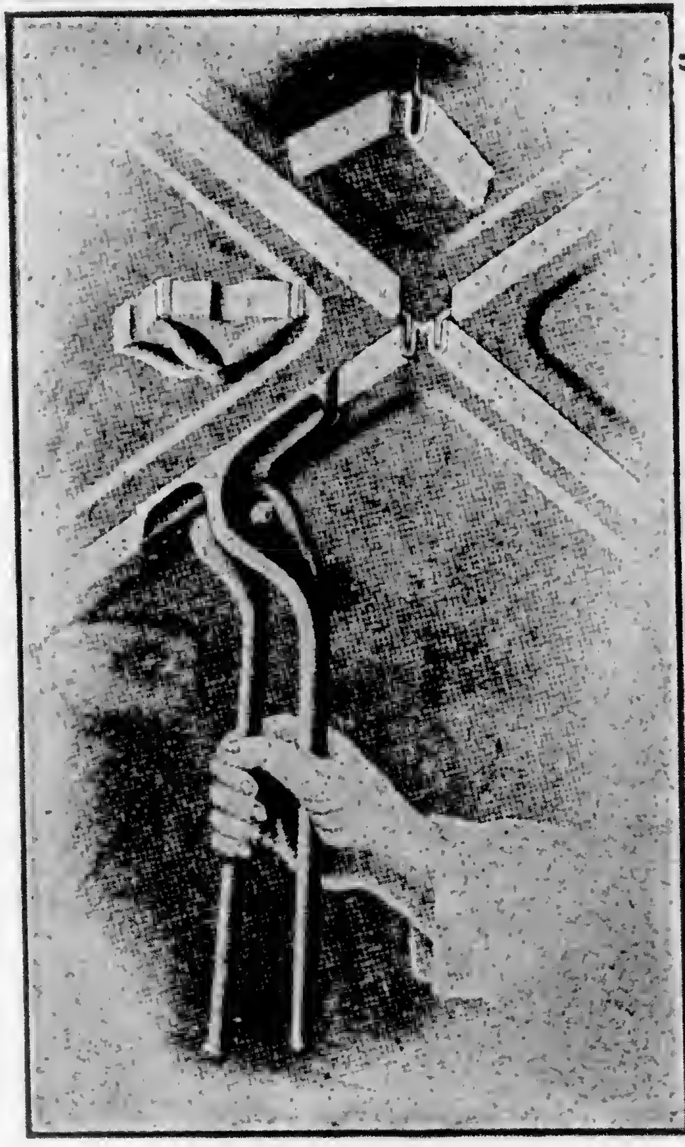

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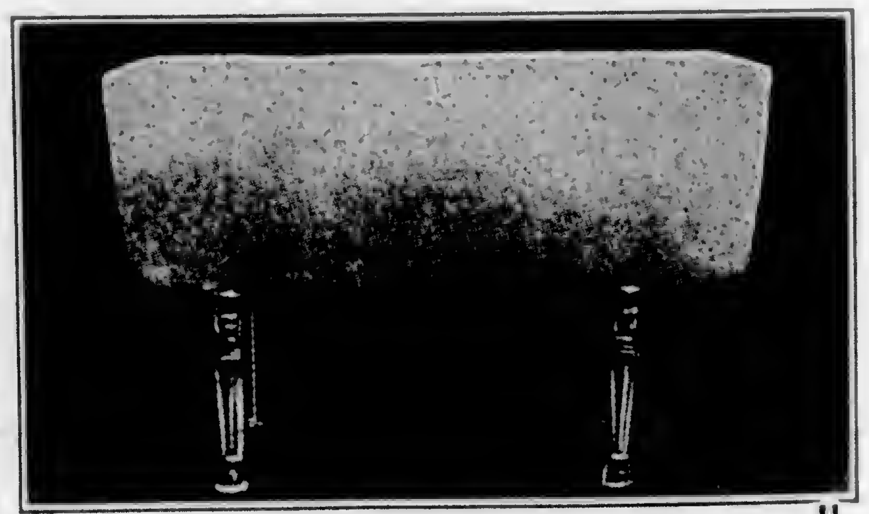

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More State Work

The advisory board to the State engineering department recently went after the plans and specifications for the new California State Hospital at Agnew with a broadax, cutting down the elaborate plans submitted $200,000 and leaving the estimated cost for rebuilding the institution destroyed by the earthquake, within the $800,000 appropriated by the last legislature.

In the assembly hall alone the board made a cut from $100,000 to $50,000, and all along the line, from cottages, halls and quarters for housing convalescent and incurable cases, the plans were modified, and it is thought made more practicable and in line with the original intention of the State engineering department.

It is stated that $600,000 will be invested in the structure which will be fully a year and a half in building.

Selon & Hemmings are the architects, and there is much complaint from state officials regarding the way plans are gotten out by this firm. Exasperating delays have marked the preparation of plans for the State Normal School, San Jose.

Baldwin's Hotel to be Built

"San Souci," the immense new hotel which the Lake Tahoe Hotel and Realty Company started some time ago, on the banks of the lake, will be carried through to completion. Contractor Lewis, who was working on the big job when the financial crisis swept the country, announces that he will again start work in a few days. The hotel will be one of the largest and finest mountain resorts in the world, it is claimed.

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Santa Fe Hotel and Station at Albuquerque, N. M.
Chas. F. Whittlesey, Architect

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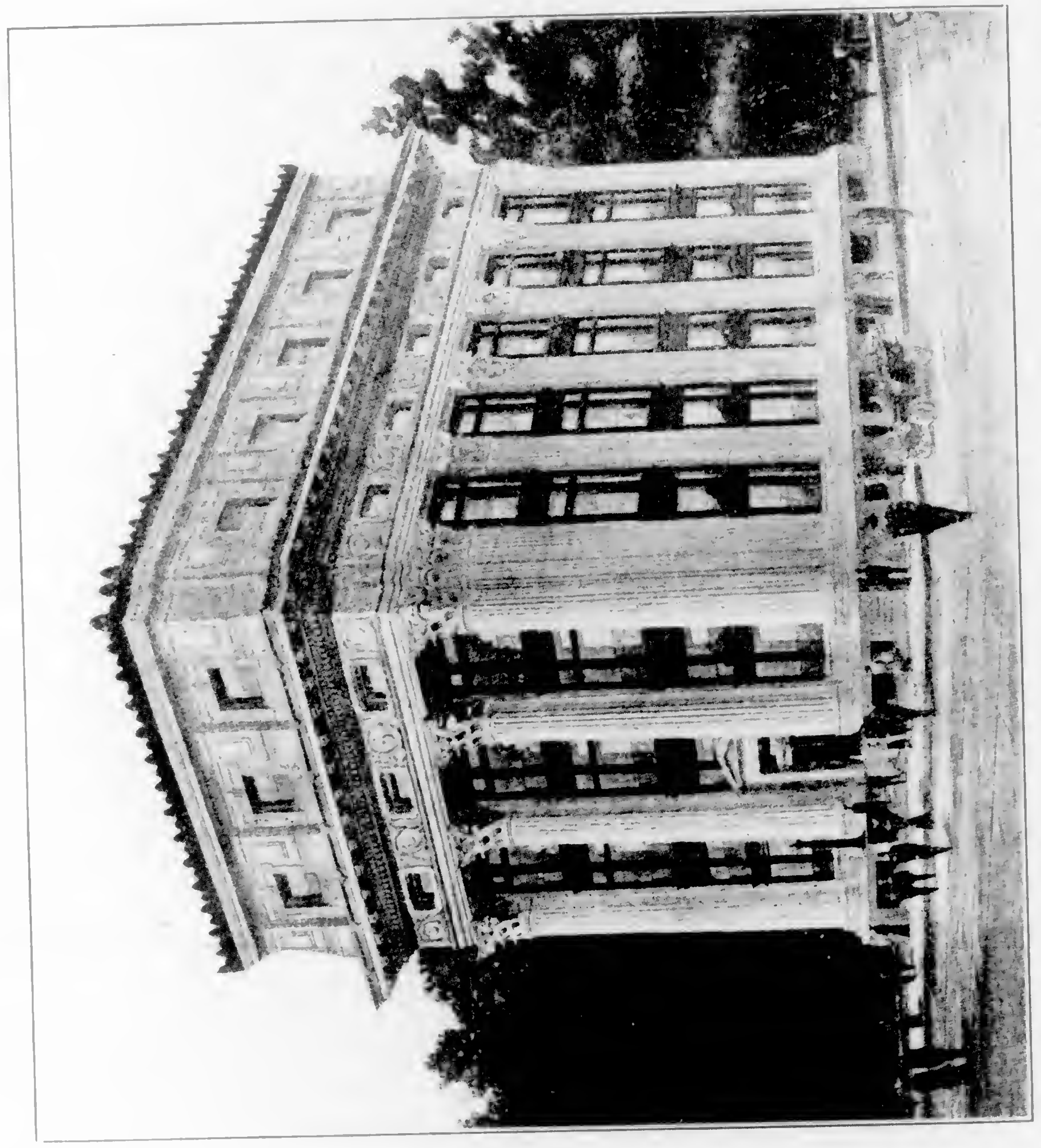

PACIFIC MUTUAL LIFE INSURANCE BUILDING, Los Angeles
Parkinson & Bergstrom, Architects

Frontispiece, The Achitect and Engineer
April, 1908

THE
Architect and Engineer
Of California

Vol. XII. APRIL, 1908. No. 3.

The Missions of California*

By HON. JOSEPH R. KNOWLAND,
Representative in Congress, Third California District.

NEARLY every period of California's early history is recalled by landmarks scattered throughout the state, these silent but eloquent reminders of the days of long ago bringing home to Californians the universally acknowledged fact that no other State in the Union can boast of a history more interesting, more picturesque, or more romantic.

The remains of the old Franciscan missions recall a most important historic period, arousing interest in the fascinating story of the establishment of the twenty-one missions, stretching from San Diego in the south to Sonoma in the north. The Franciscan missionaries were the original pioneers of California, sowing the first seeds of civilization and establishing the first permanent settlements. It was in the year 1769, at San Diego, that the first mission was established. Monterey was the next spot selected. Thus the work progressed until a chain of missions had been established, located in such proximity that a traveler could start on foot from San Diego and nightly enjoy the hospitality of a different mission until Sonoma was reached. San Francisco Solano (Sonoma) mission was the last to be founded, 1823 being the date of its establishment.

Of the original twenty-one mission establishments, but two have entirely disappeared—San Rafael Arcangel and Santa Cruz. Of the remaining nineteen, all but five are in a fair state of preservation, and portions of at least four of these five can be saved.

Crumbling walls mark the spot where Soledad mission once stood, and in a few more years all trace of this mission, located near the town of Soledad, in Monterey county, will be obliterated. San Diego, the mother mission, is in a poor state of preservation, little remaining but the front wall of the chapel, which has been safeguarded by the Landmarks Club of Southern California. La Purisima Concepcion, five miles from the town of Lompoc, in Santa Barbara county, was fast reaching a state of disintegration when restoration would be impossible, but fortunately the property was turned over to the Landmarks Club of Southern California, which organization, under the leadership of Mr. Charles F. Lummis, is exerting every effort to raise funds for its preservation.

San Francisco Solano (Sonoma) mission was purchased in 1903 with a portion of the Landmarks Fund raised by the San Francisco Examiner, with the assistance of the California Historic Landmarks League and other patriotic bodies. In 1905 the California Legislature passed an act providing for the acquisition, preservation and protection of the Sonoma mission property, which was turned over to the State without cost.

One of the most beautiful and less frequently visited missions is located

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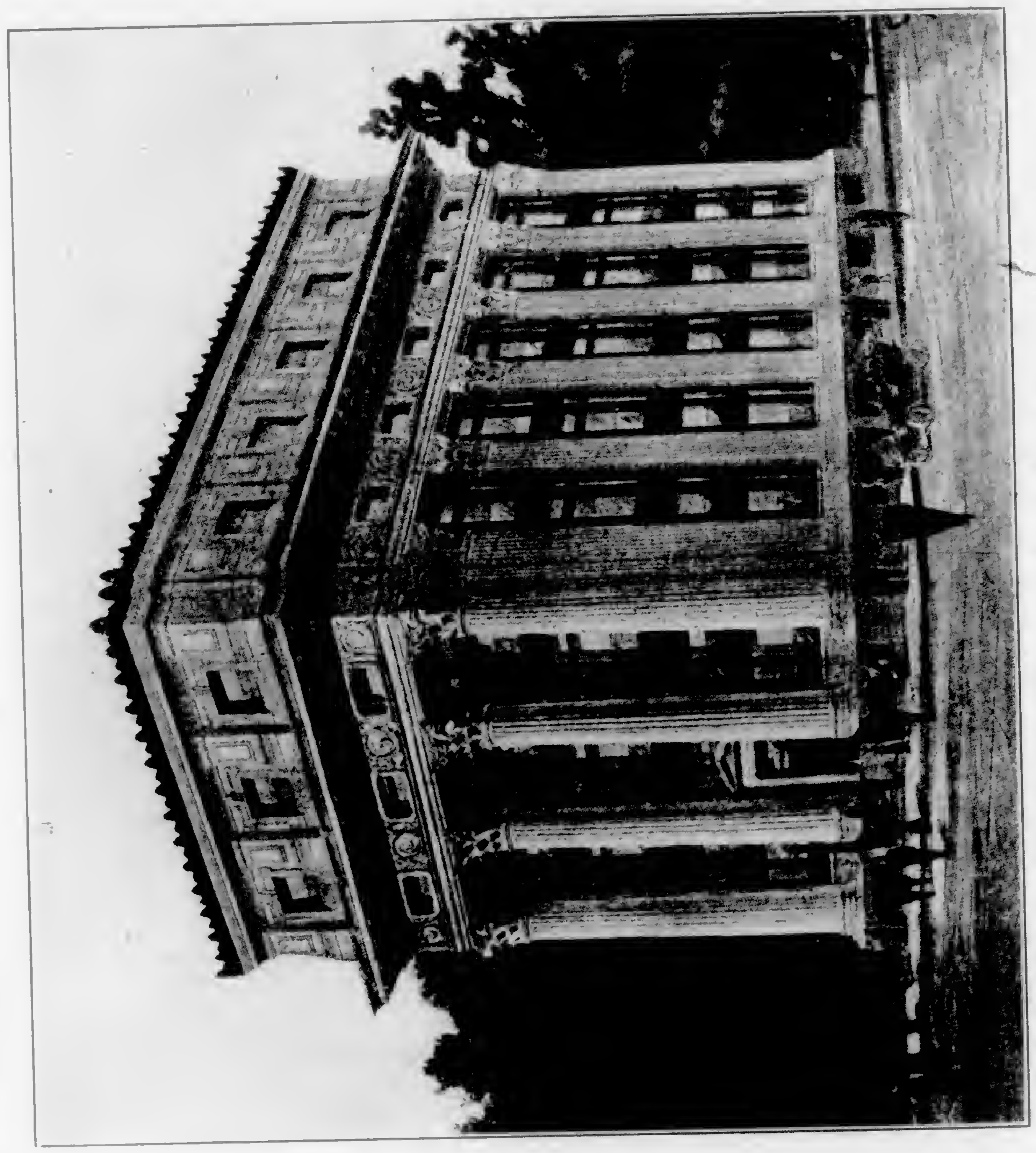
* Extracts of article written by Congressman Knowland for the California Blue Book.



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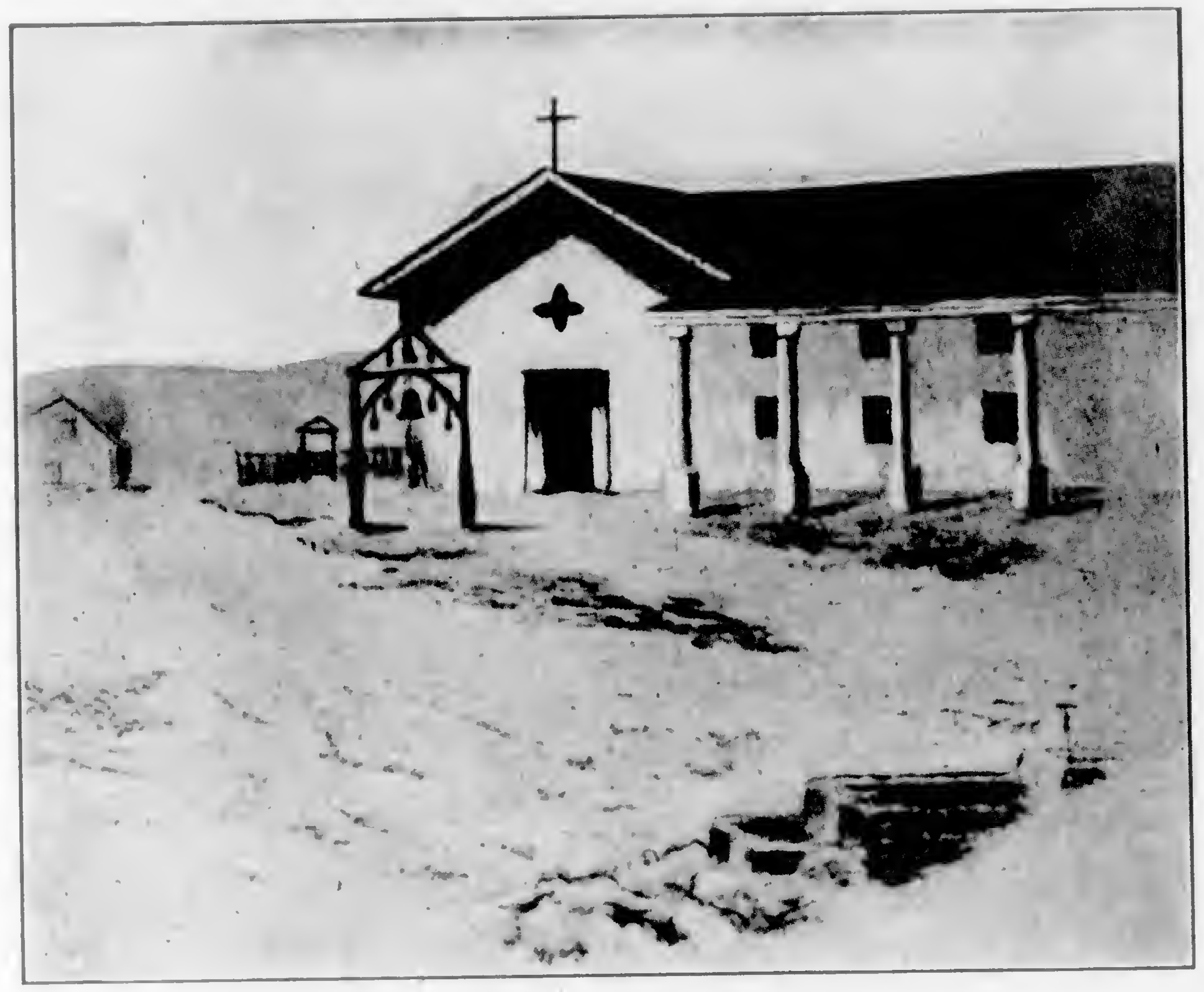
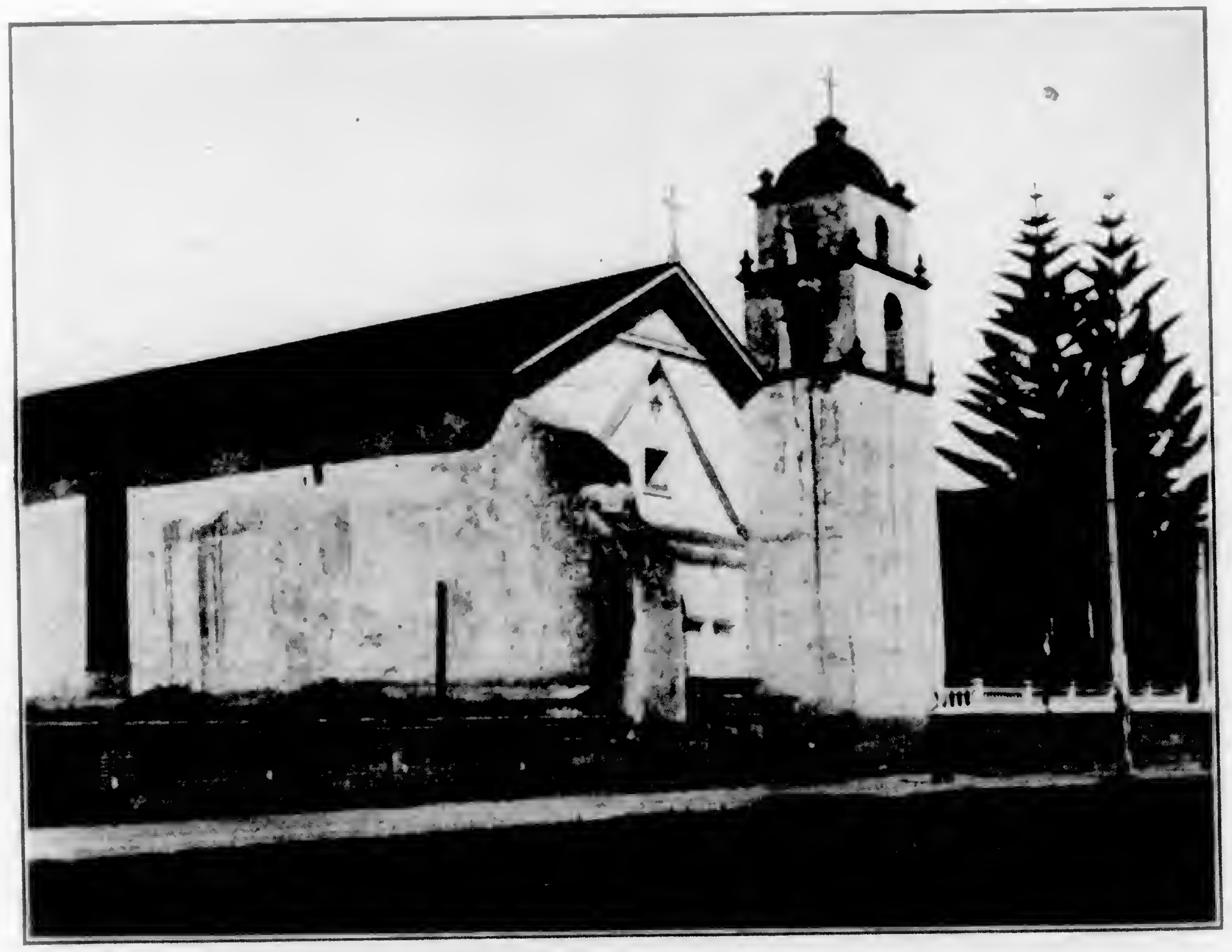
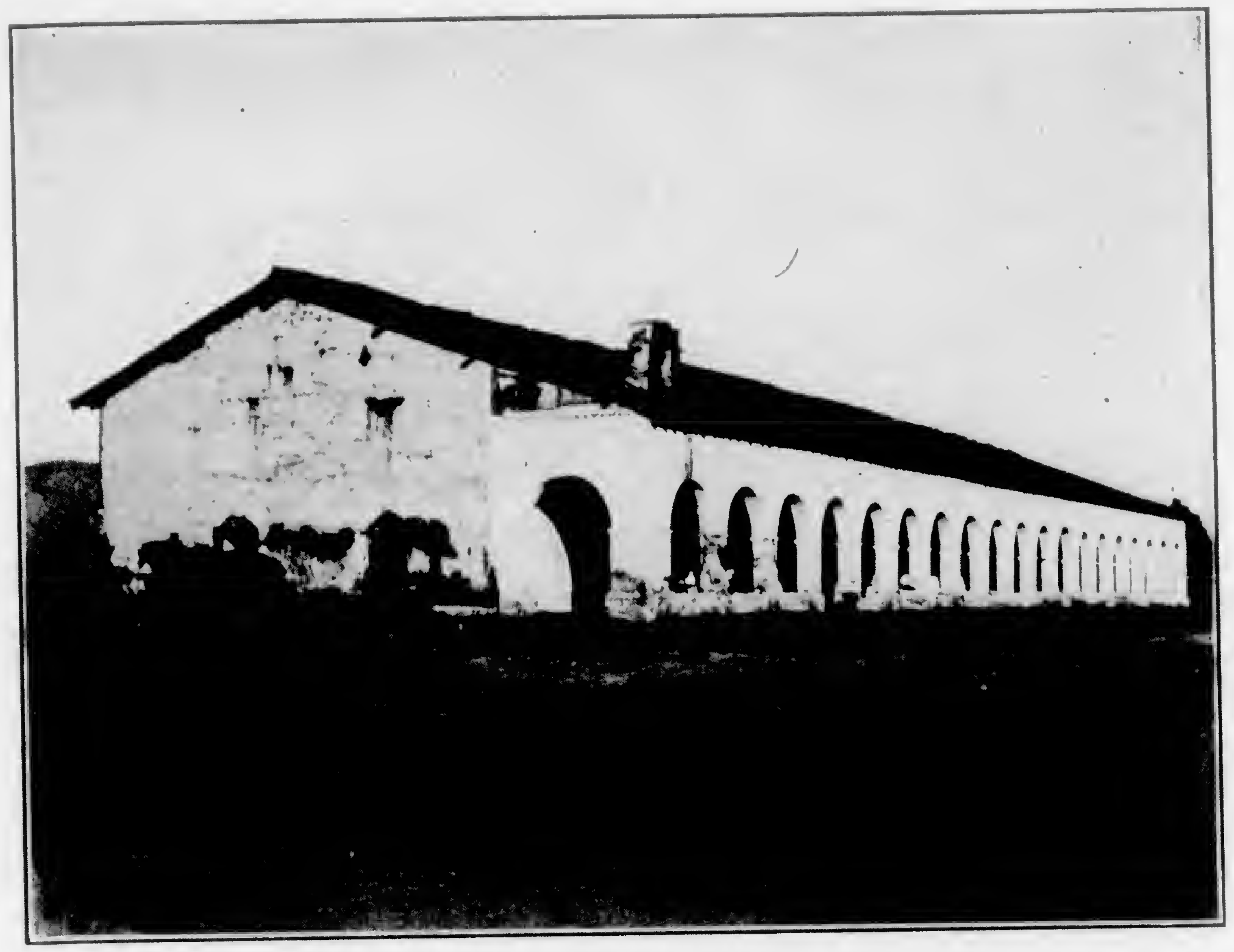


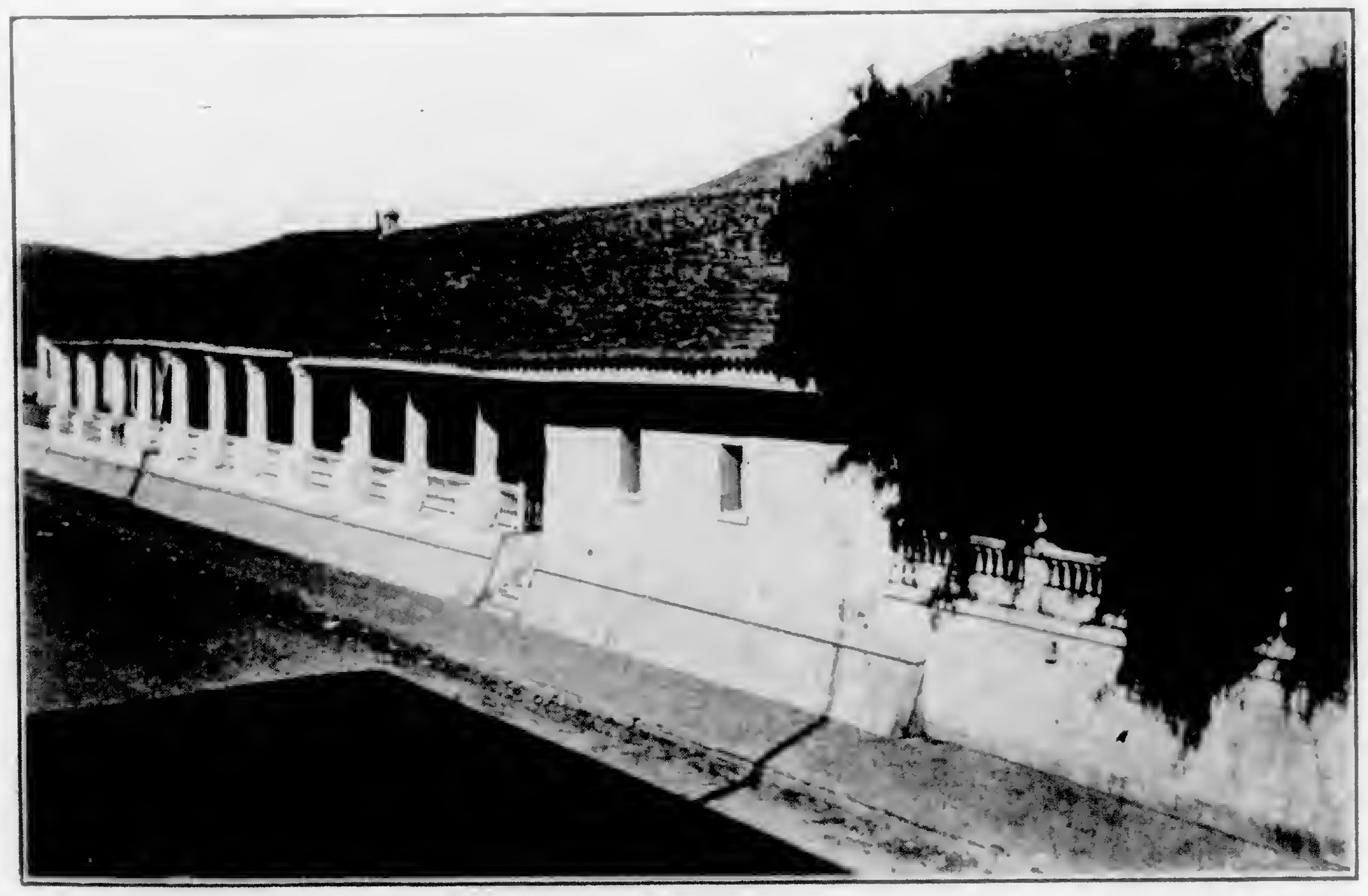
San Rafael Arcangel, Marin County
Founded December 18, 1817



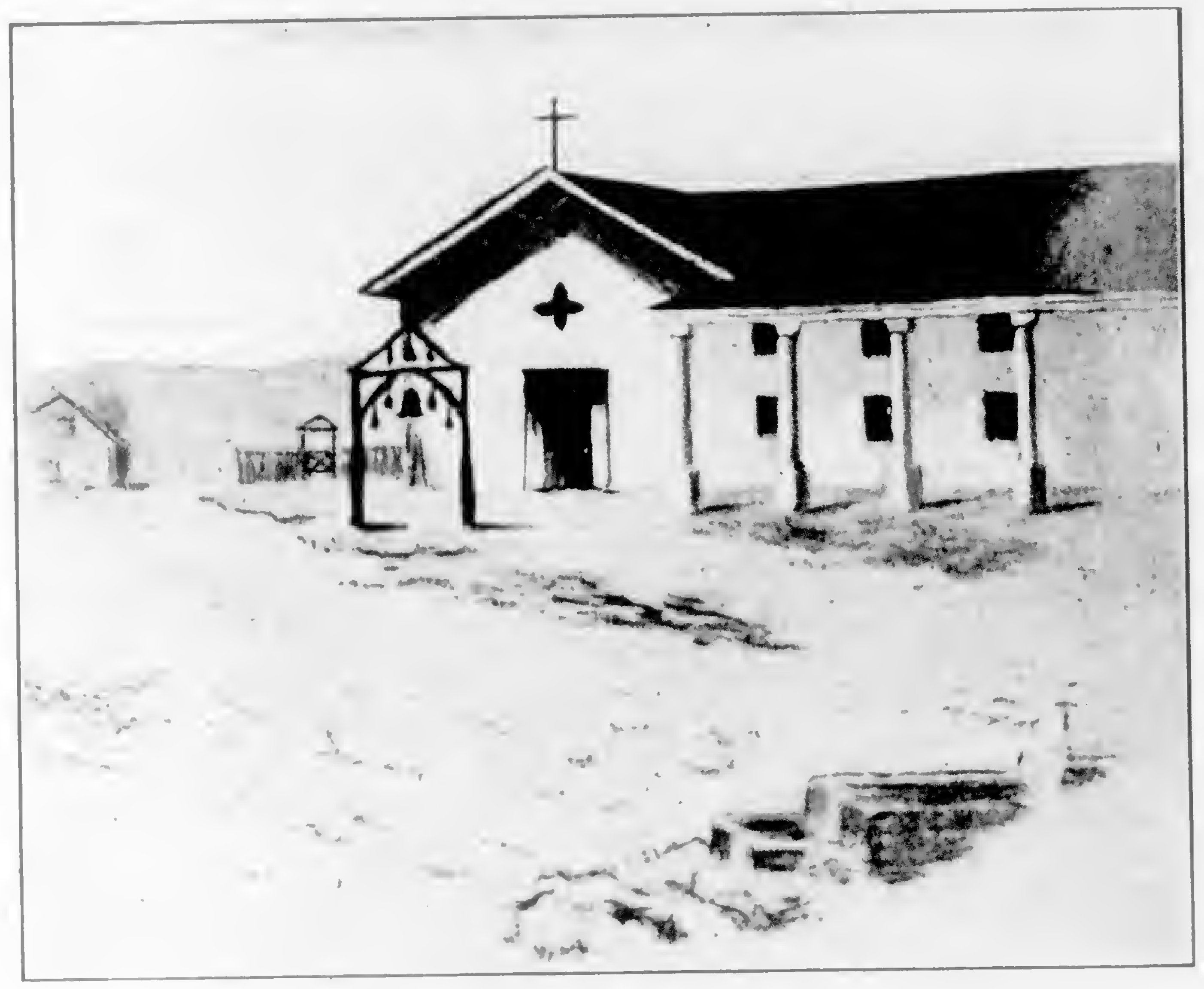
San Buenaventura, Ventura County
Founded March 31, 1782



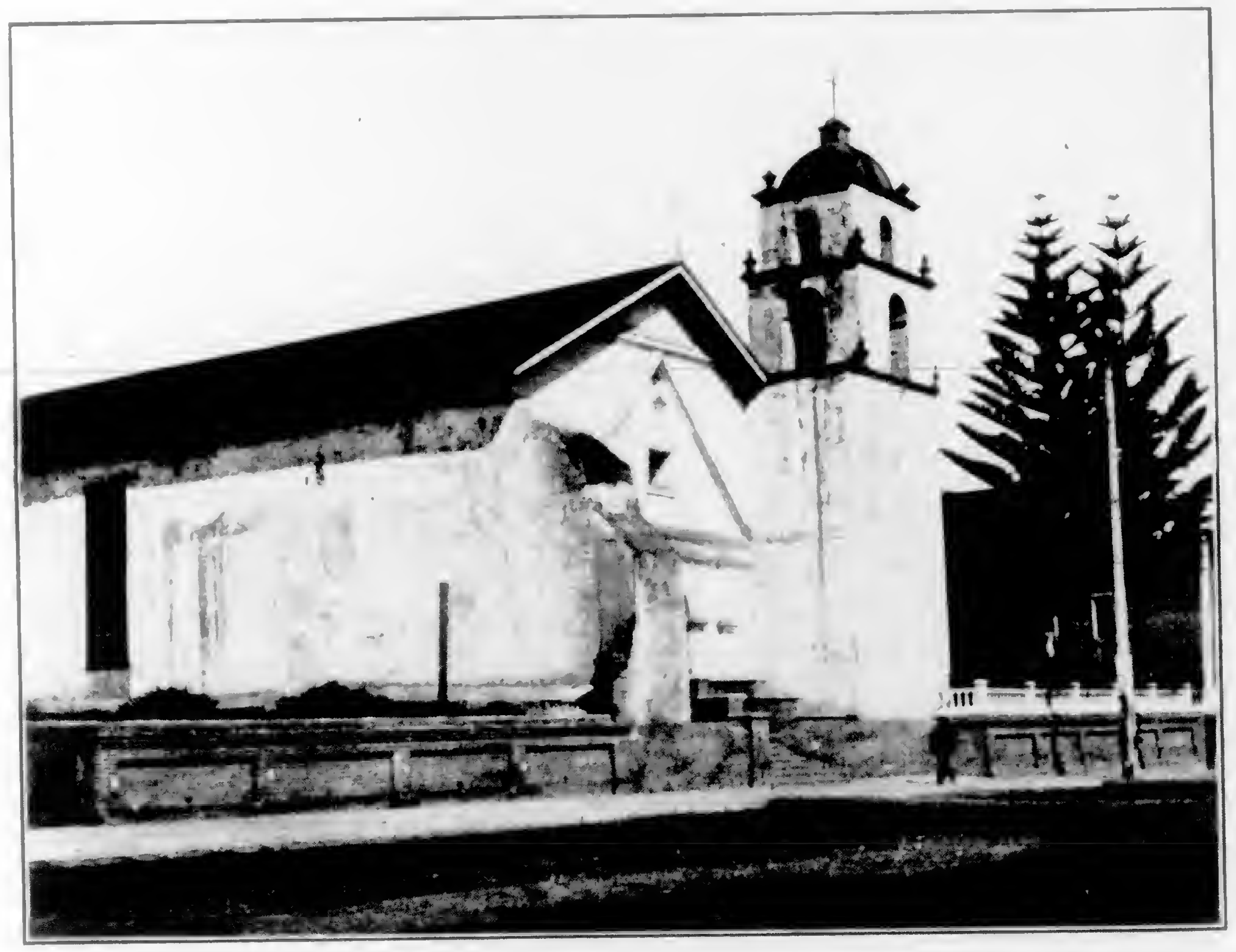
San Fernando Rey De Espana, Los Angeles County
Founded September 8, 1797



San Luis Obispo De Tolosa, San Luis Obispo County
Founded September 1, 1772



San Rafael Arcangel, Marin County
Founded December 18, 1817



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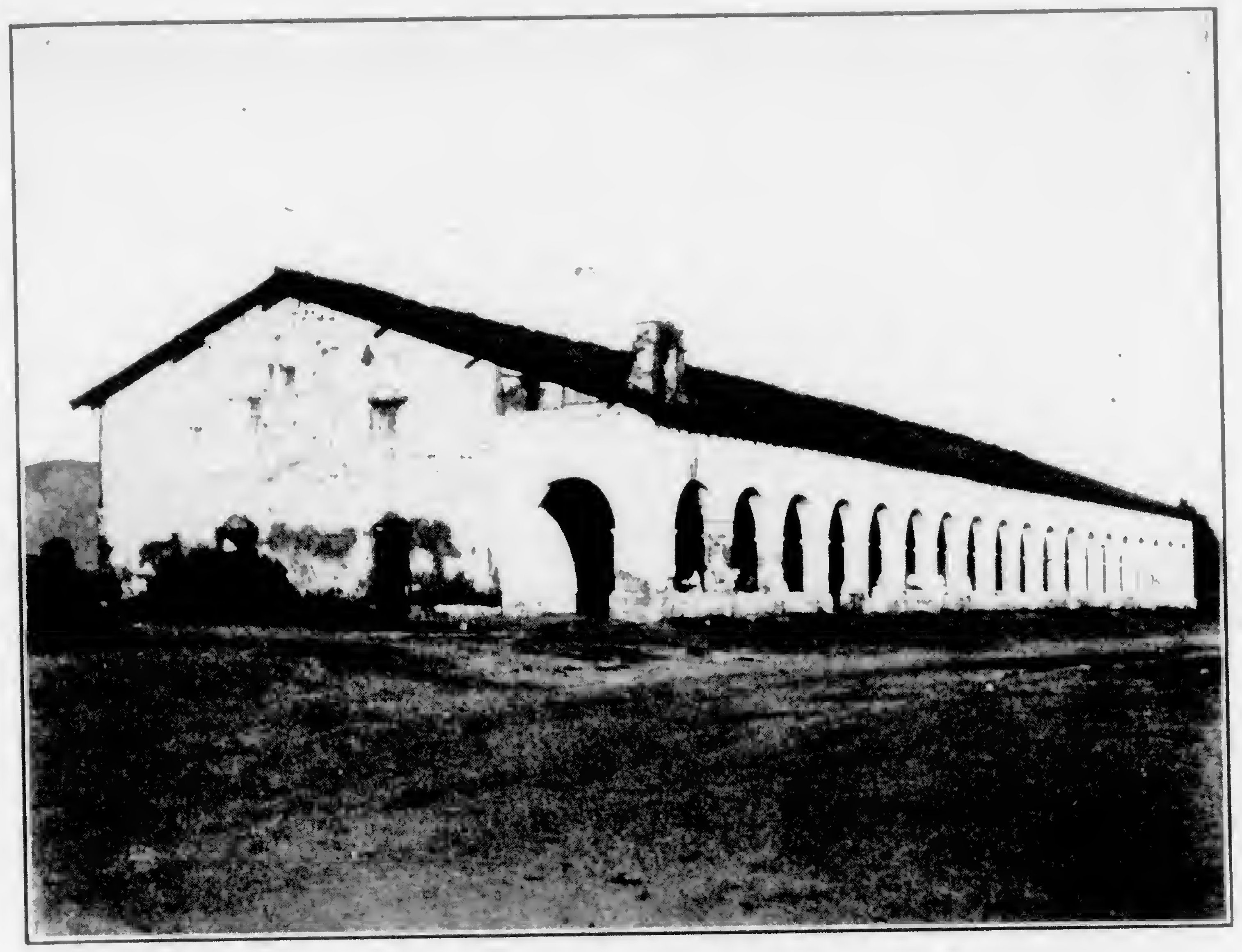

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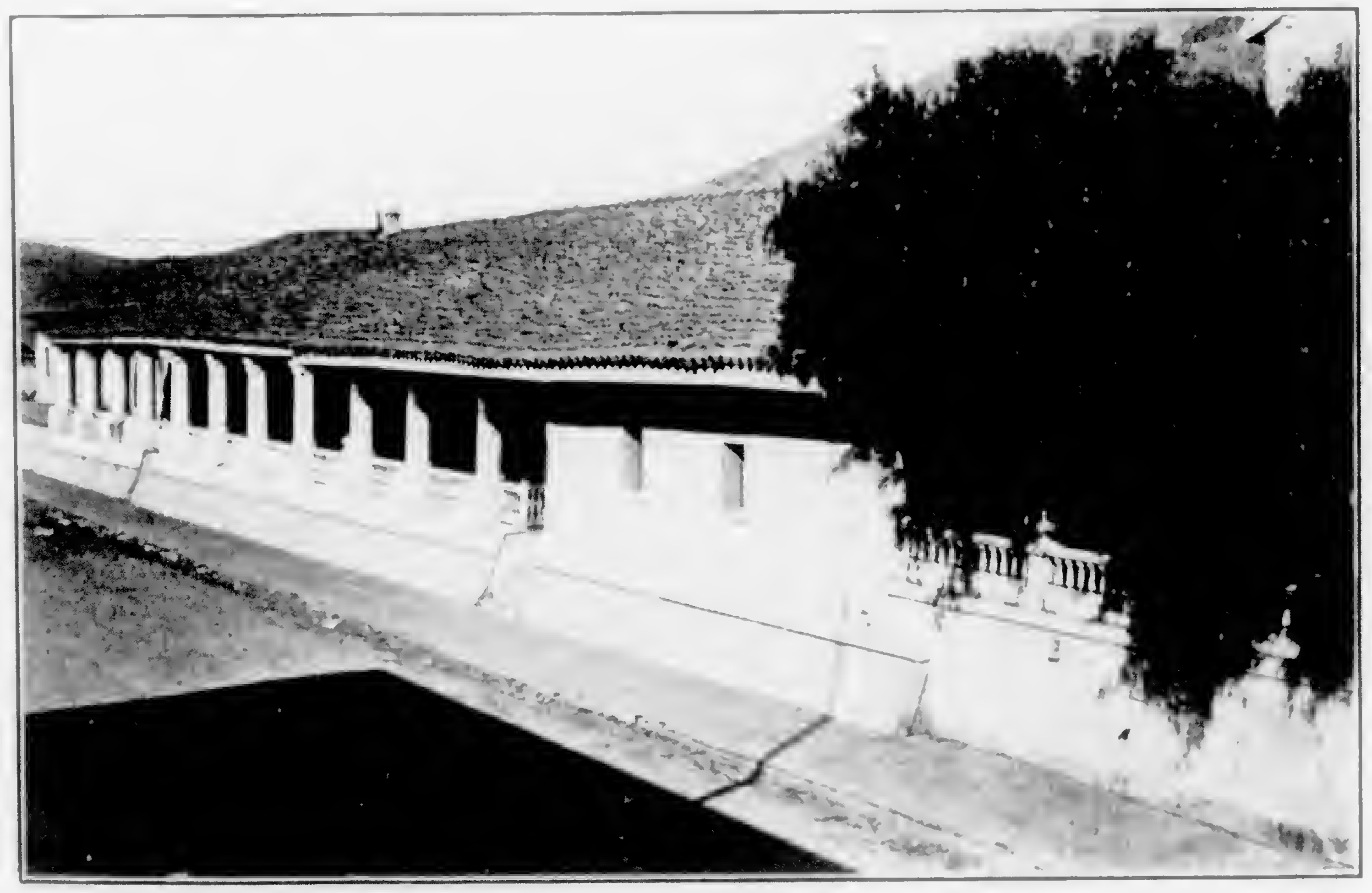

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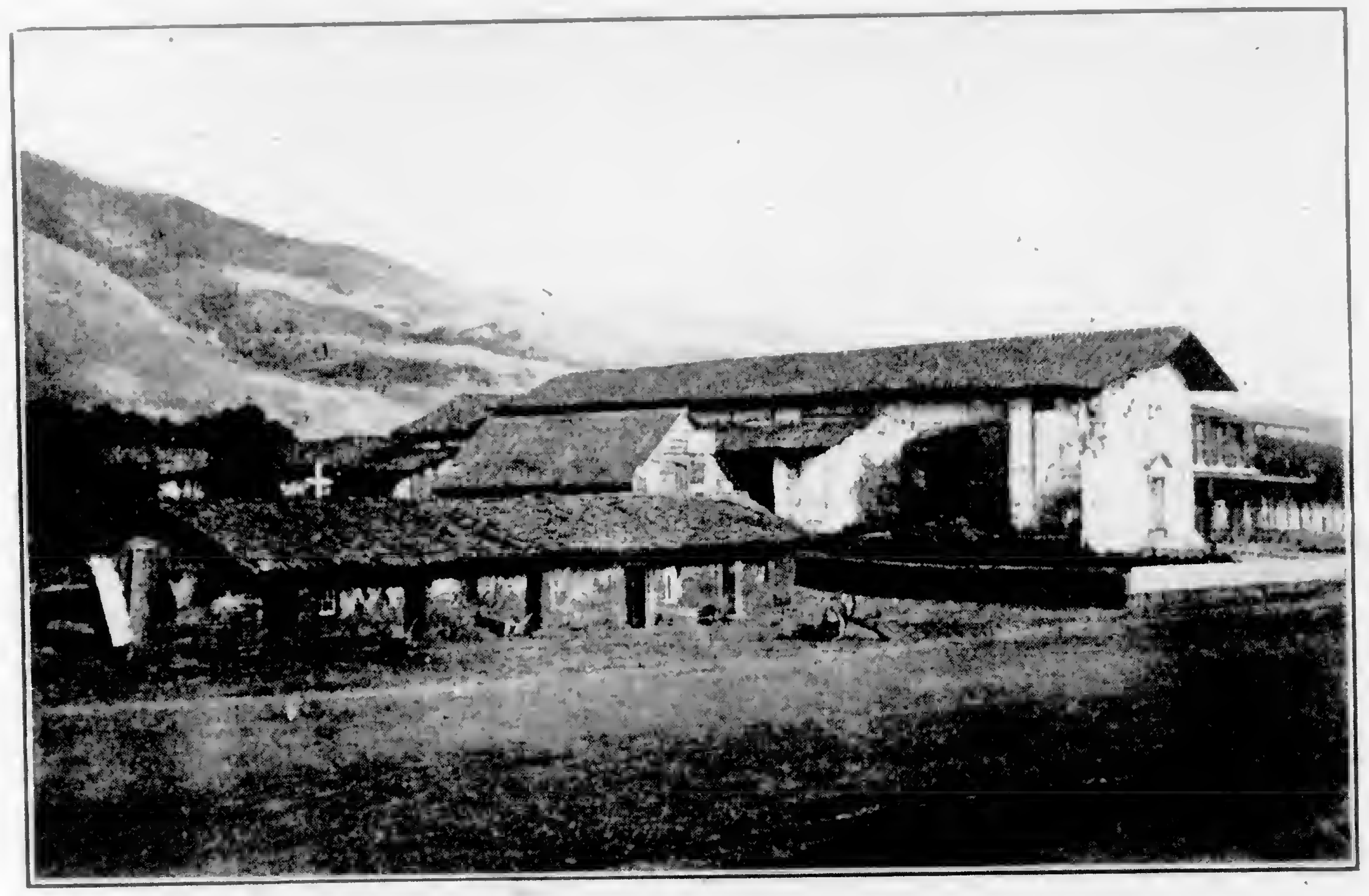
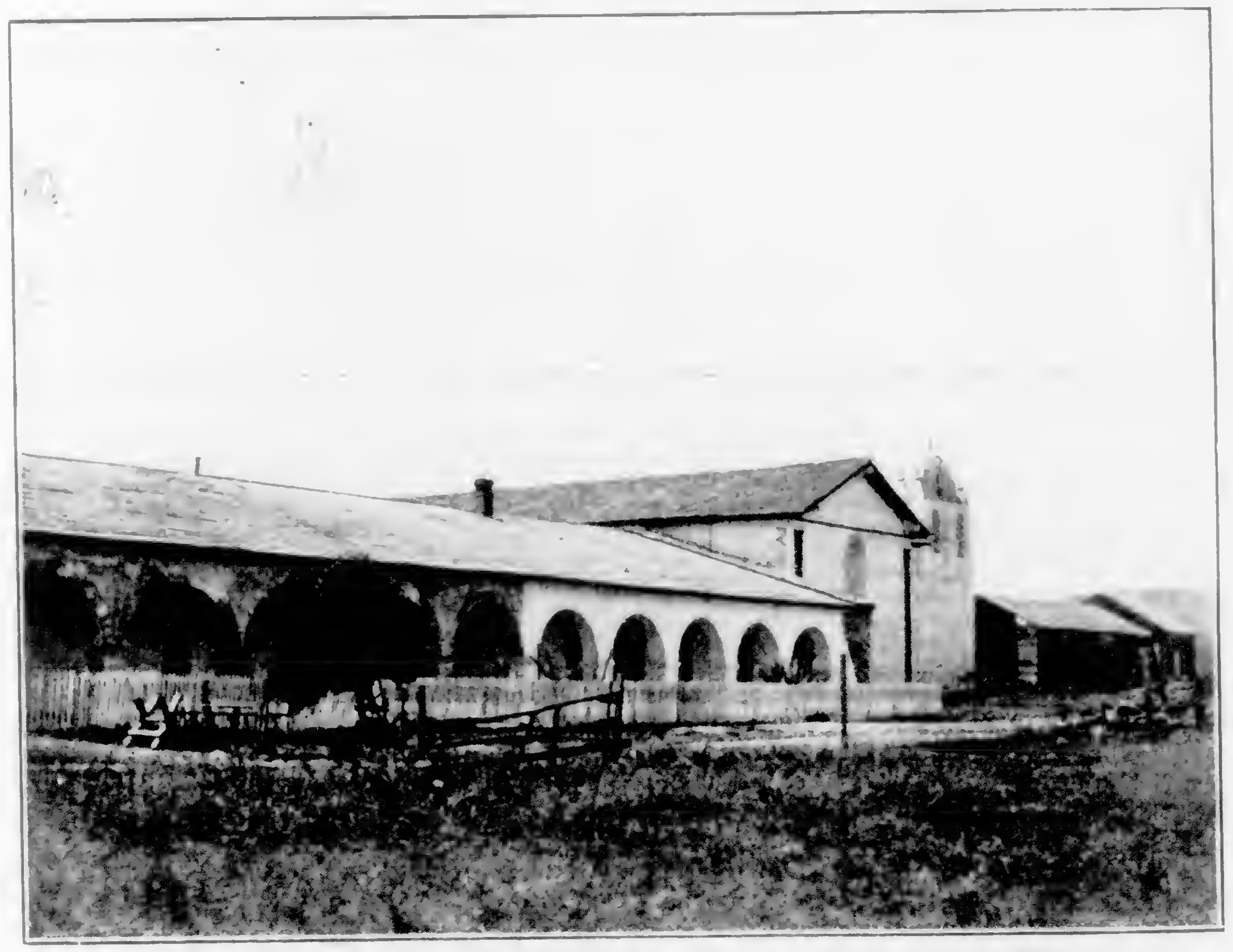
Founded September 1, 1772



San Jose, Alameda County
Founded June 11, 1797



Santa Ynez, Santa Barbara County
Founded September 17, 1804

in Monterey county, twenty-six miles from Kings City. This is mission San Antonio de Padua, a most picturesque ruin. It was formerly one of the most extensive of the mission establishments. For years it was neglected with no one to stay the hand of the vandal. The mission stands alone, its crumbling walls and deserted buildings appearing as if untouched since the departure of the padres and neophytes years ago. In 1903 the California Historic Landmarks League began the work of restoration, but the funds at hand proved insufficient to complete the re-roofing of the chapel, and for two winters the great adobe walls, six feet in thickness, were exposed to the elements, much damage resulting. After great effort a few hundred dollars were raised in 1905 and work resumed, but with this small sum it was only possible to erect a permanent roof over the vestibule. Unfortunately, however, the earthquake of 1906 wrought great damage, completely demolishing the newly erected walls and seriously injuring other portions of the mission. Conditions were most discouraging and the officers of the League debated as to the advisability of further attempting to save this old landmark, but the determining factor was the knowledge that San Antonio was one of the last of the remaining missions to be restored, and that another winter's rains would leave it a hopeless ruin. With funds received from the Grand Parlor of Native Sons, in June, 1906, the rebuilding of the walls commenced, and the rains of the winter of 1906-7 found all but a section of the chapel walls protected by a permanent roof, which unfinished portion was completed before the winter of 1907-8.

At San Luis Rey, in San Diego county, the church is in a good state of preservation, but the picturesque arches, of which there were originally thirty-two, ornamented with latticed railings, are year by year crumbling. At San Juan Capistrano, in Orange county, the great chapel, in the form of a cross, was years ago destroyed by an earthquake, but a number of other buildings, safeguarded by the Southern California Landmarks Club, remain. San Gabriel mission, ten miles from the city of Los Angeles, is in use, services being regularly held within the walls of the old structure. Twenty miles north of Los Angeles stand the remaining buildings belonging to San Fernando Rey. The chapel was re-roofed by the Southern California Club; the building with the arched corridor is in fair state of preservation. Santa Barbara and San Buenaventura missions are in an excellent condition of preservation. This is likewise the case with Santa Ynez mission, in Santa Barbara county. The two missions of San Luis Obispo and San Juan Bautista, located respectively in the counties of San Luis Obispo and San Benito, have been to a certain degree disfigured by the erection of modern church steeples. Both missions are very interesting to visit. The recent earthquake did considerable damage to San Juan Bautista.

While the exterior of Santa Clara mission is quite modern, painstaking effort has been put forth to have the interior of the modern chapel conform to the old. This is particularly true of the decorated ceiling above the sanctuary, each board in the old ceiling having been carefully taken down, numbered, and later made use of in the new church. A portion of the sanctuary rail was made from the beams of the old chapel. The old adobe walls still constitute a part of the building adjoining the chapel and opening into the patio. Many interesting and valuable mission relics are carefully preserved in a room set aside for this purpose. The mission a few miles from the old town of Monterey, San Carlos Borromeo, sometimes confused with the old church located within the city proper, has been restored with a vengeance, a peaked shingle roof destroying, to a great extent, the original beauty of this structure. Little remains of Mission San Jose, in Alameda county. The old mission San Miguel, in the town of like name, in San Luis Obispo county, is most interesting, its interior still showing the decorations made by the Indians. San Francisco de Asis

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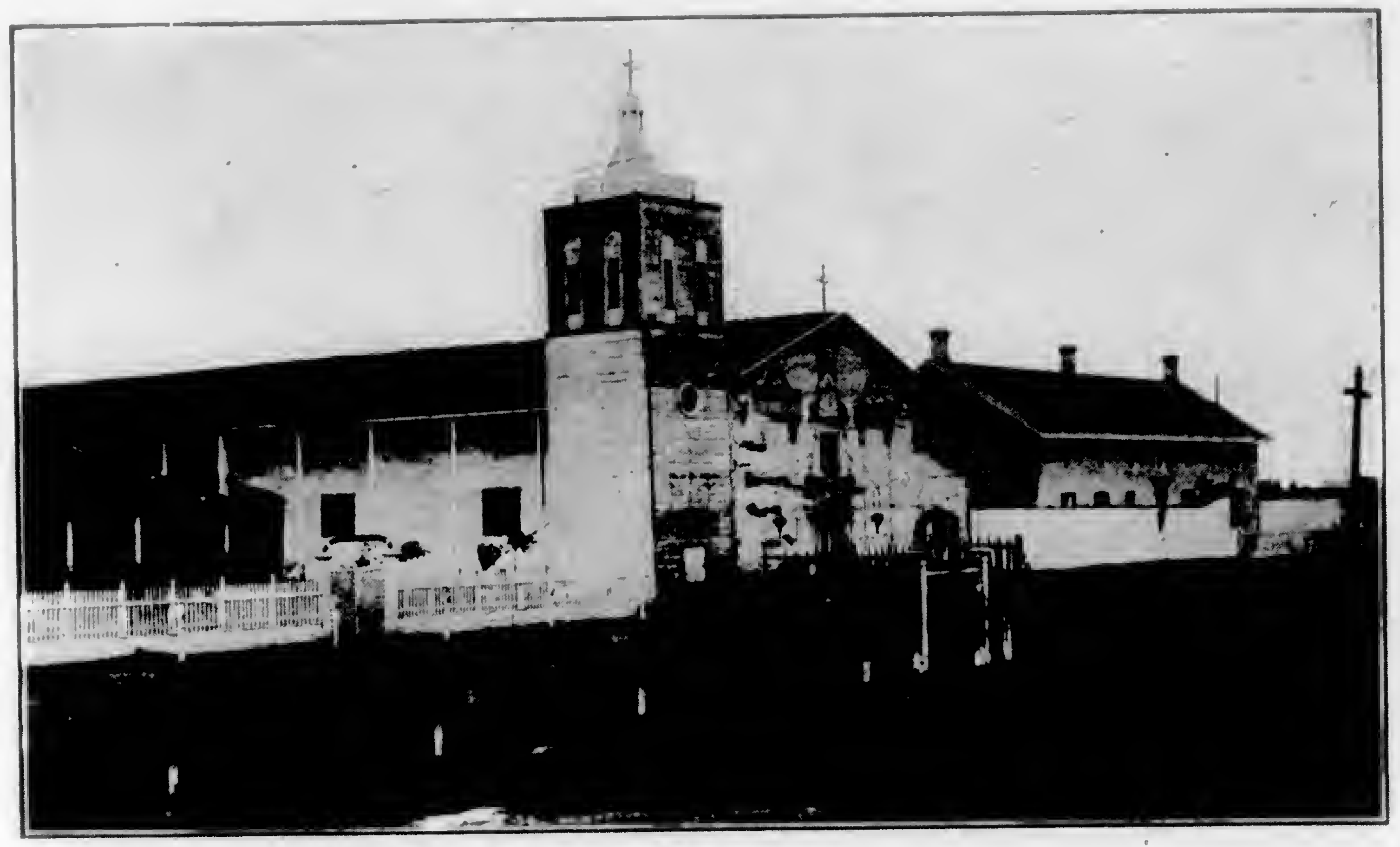
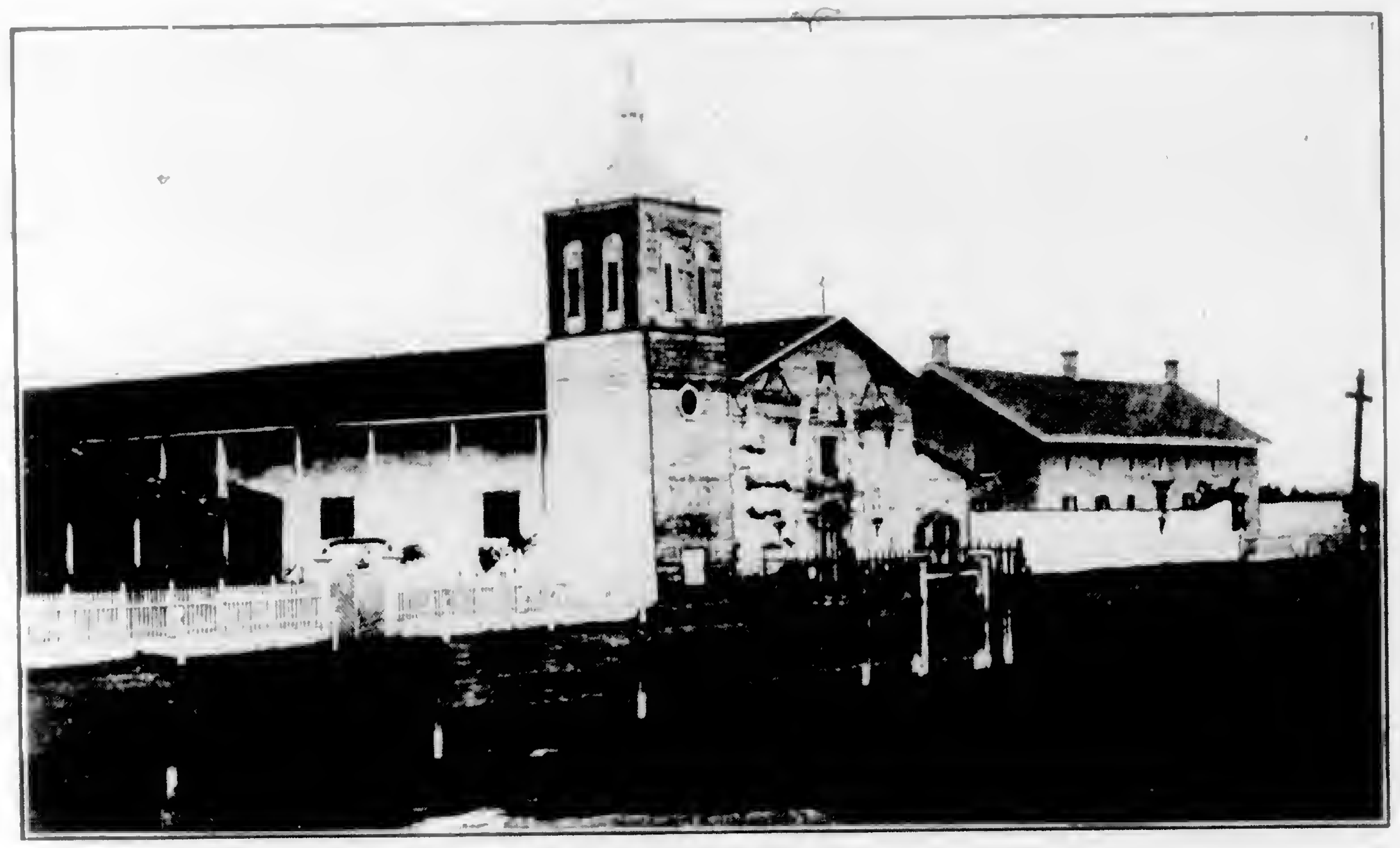


Santa Clara, Santa Clara County
Founded January 18, 1771

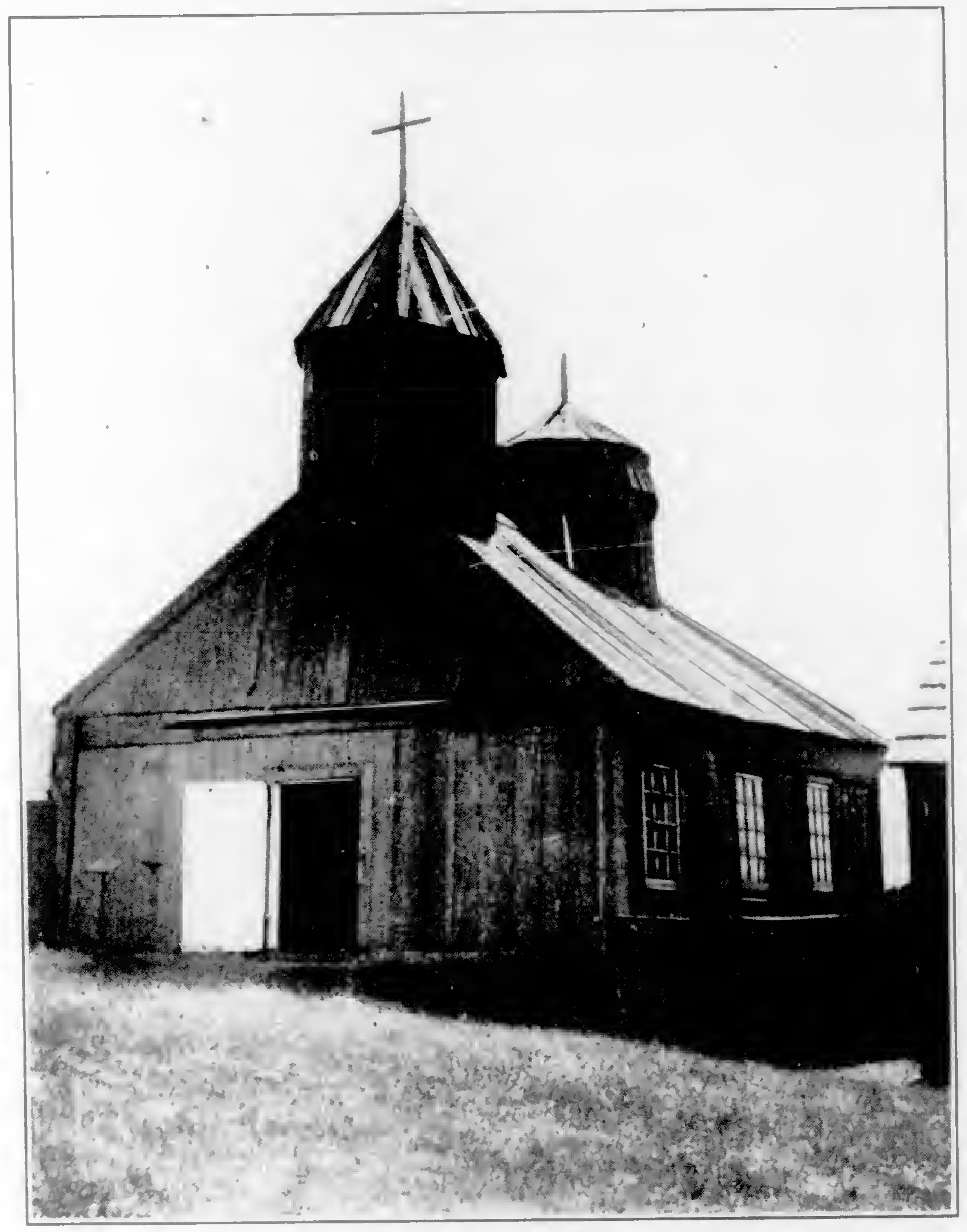
Old Greek Chapel, Fort Ross, Sonoma County

San Luis Rey De Francia, San Diego County
Founded June 13, 1798

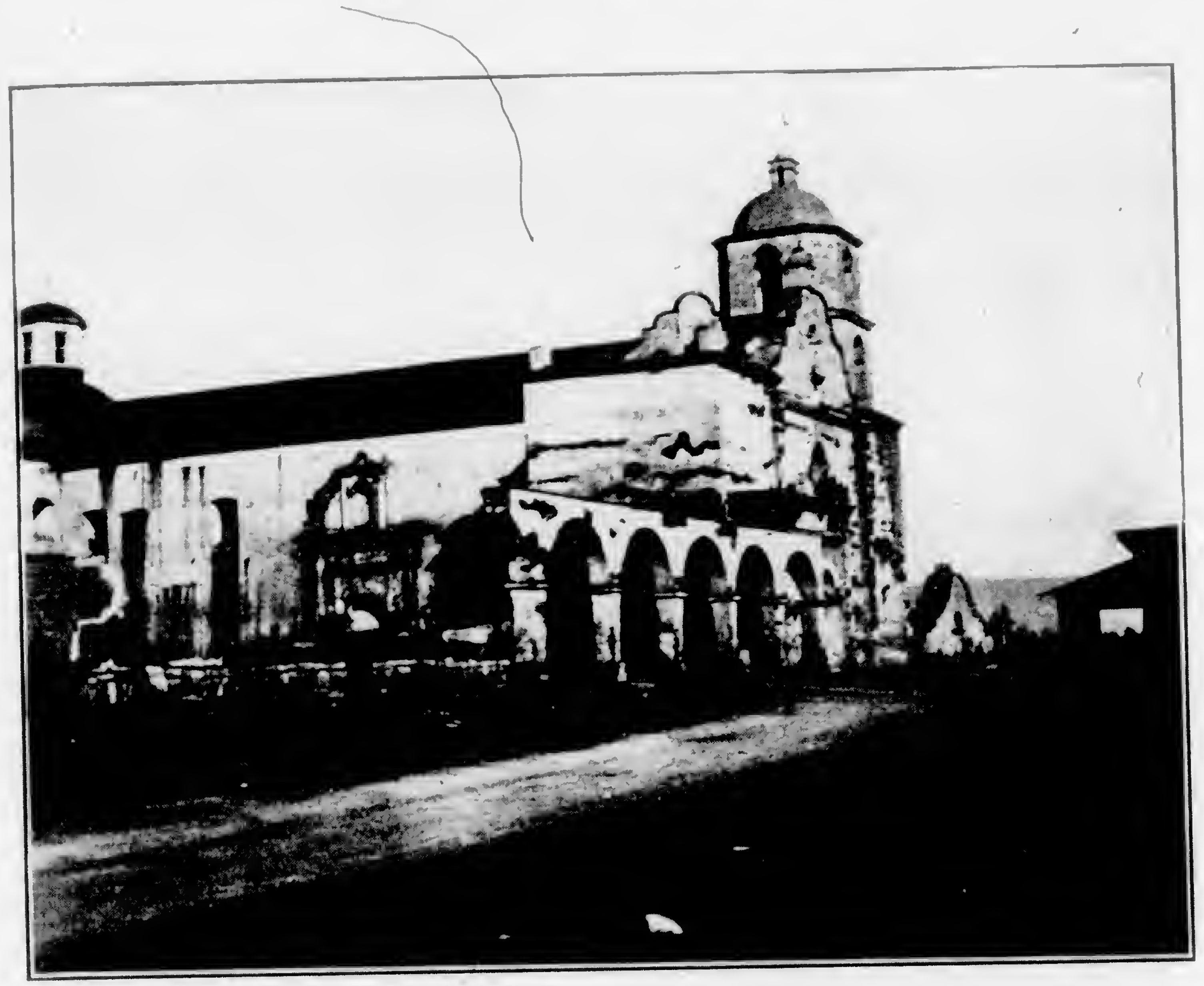
San Francisco Solano, Sonoma County
Founded August 23, 1823



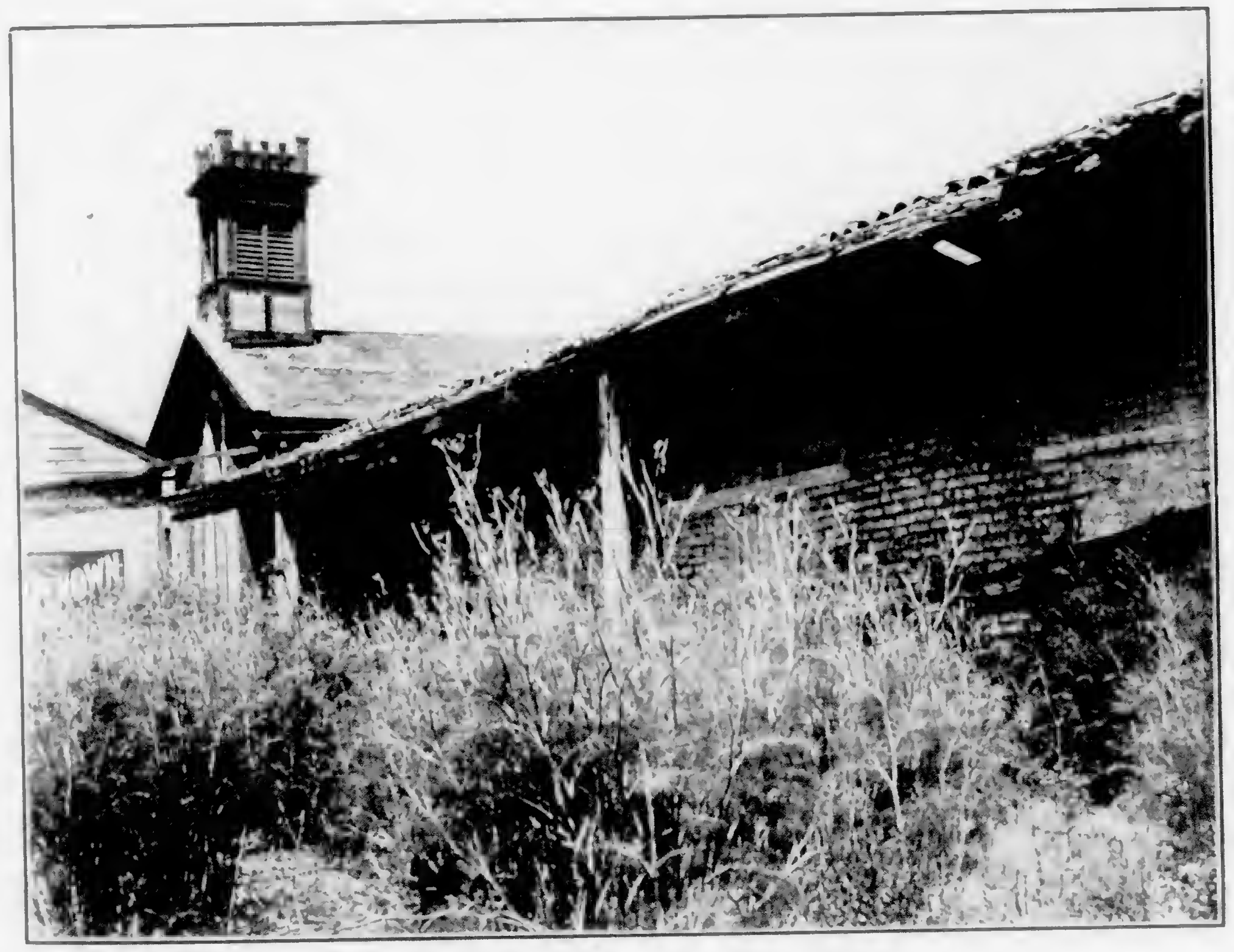
Santa Clara, Santa Clara County
Founded January 18, 1771



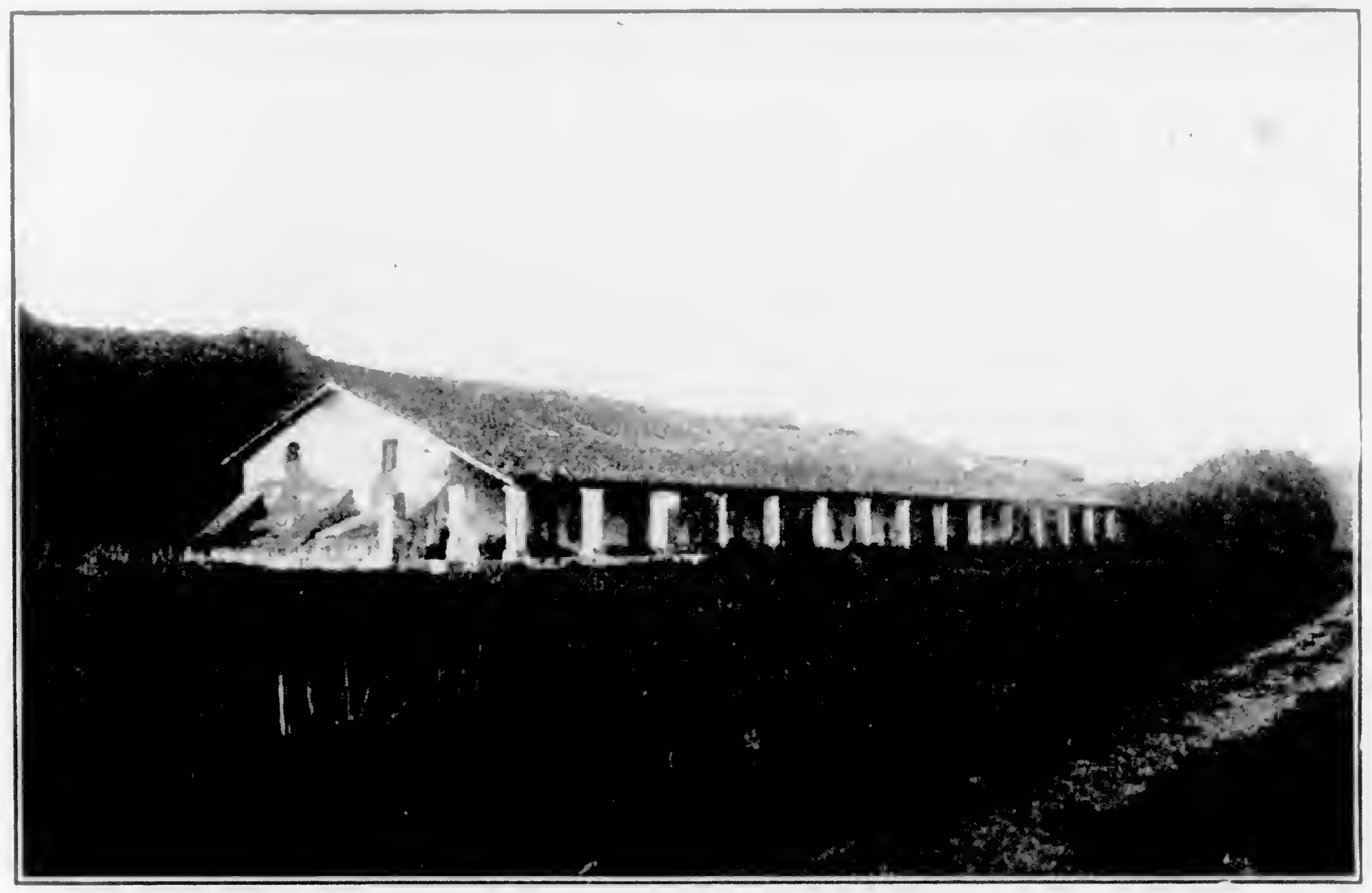
Old Greek Chapel, Fort Ross, Sonoma County



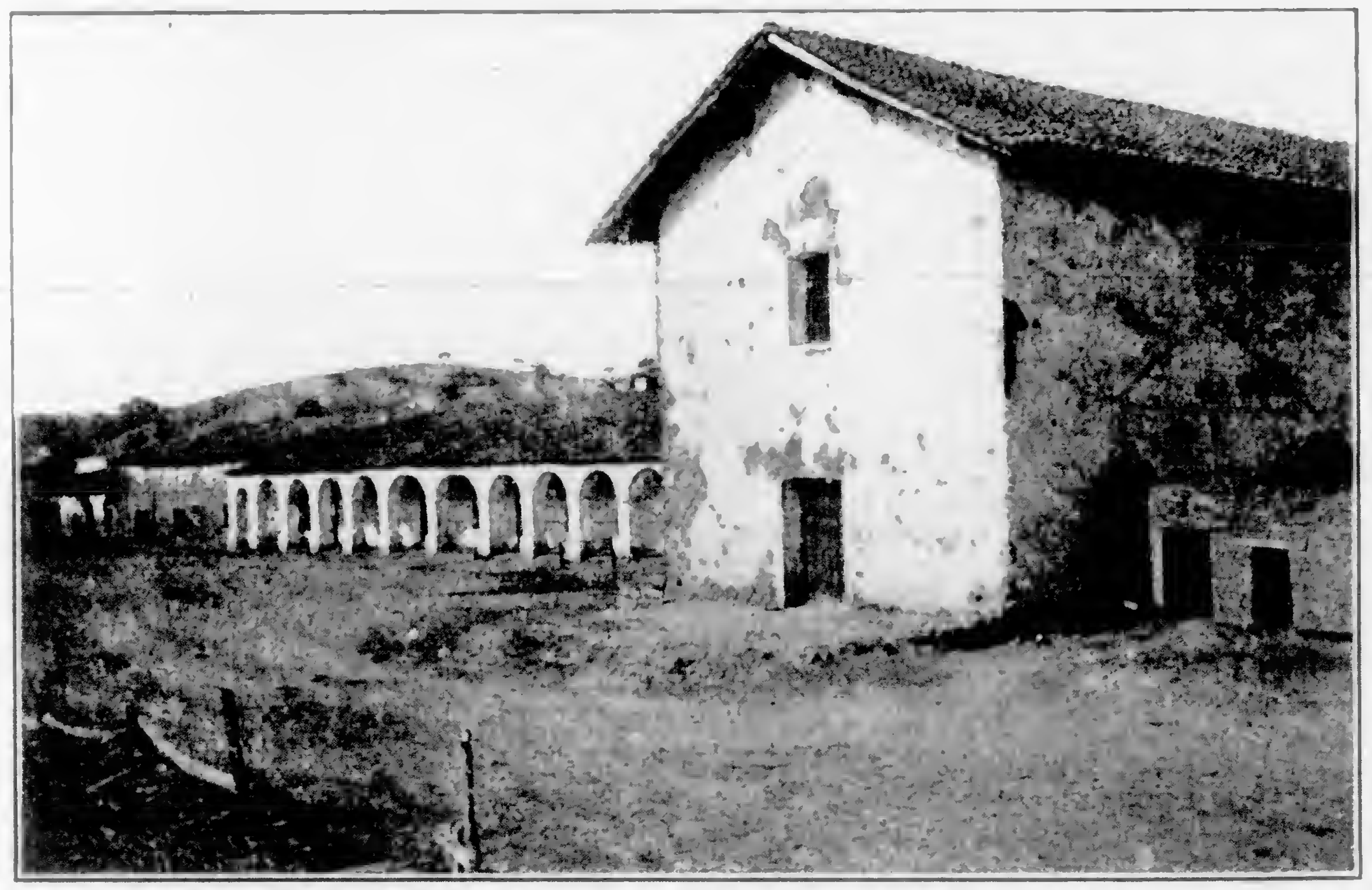
San Luis Rey De Francia, San Diego County
Founded June 13, 1798



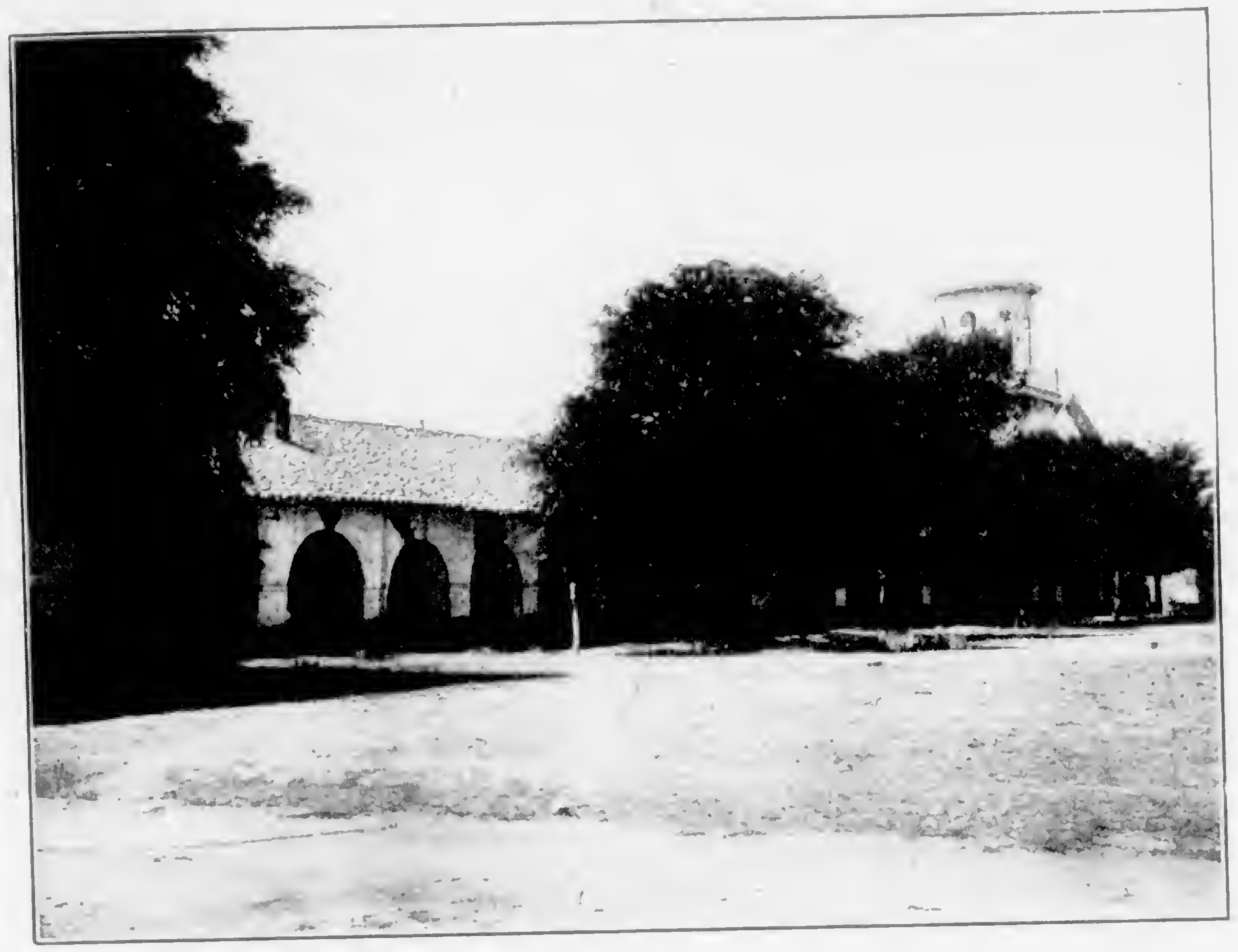
San Francisco Solano, Sonoma County
Founded August 23, 1823



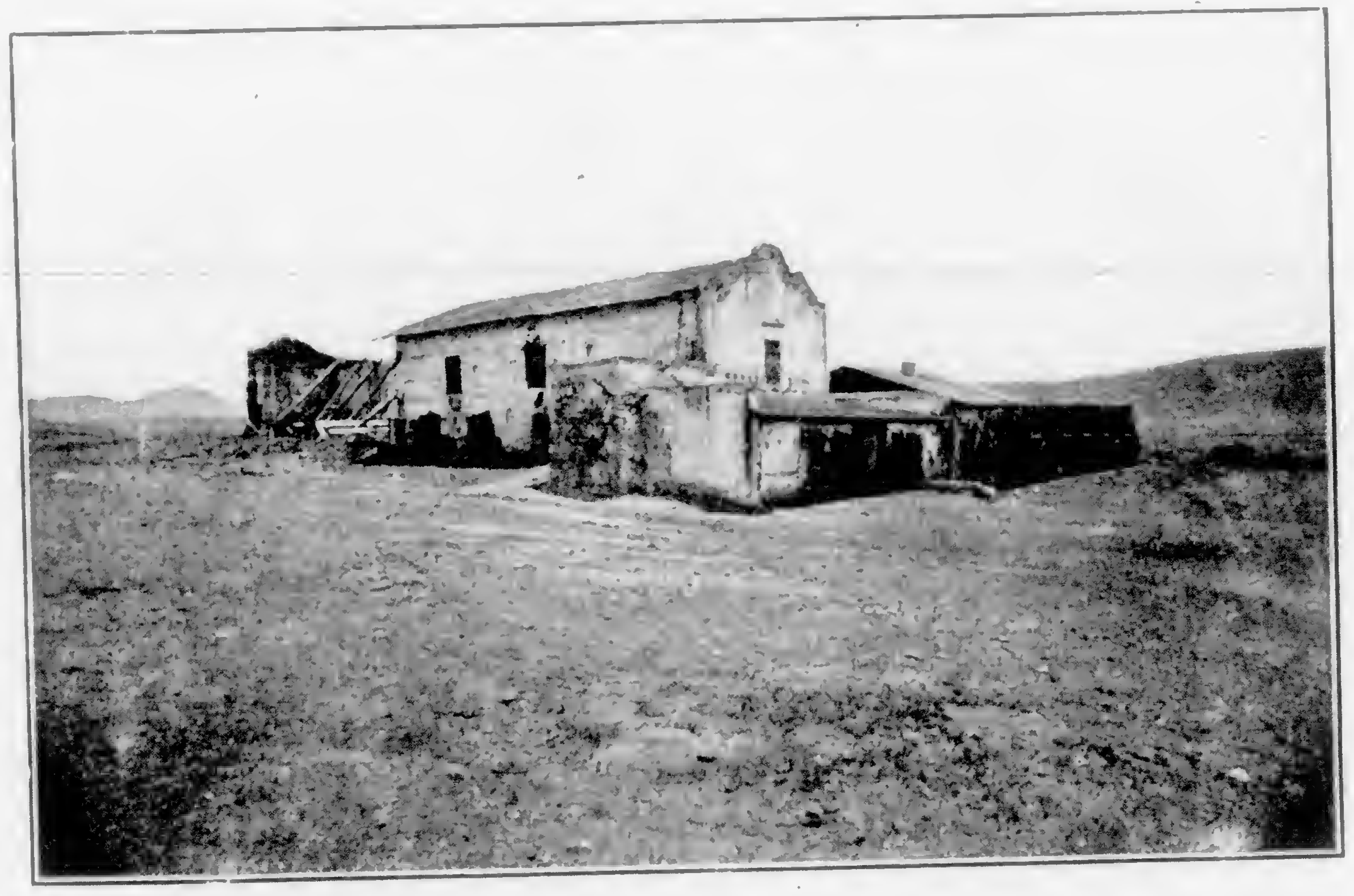
La Purisima Concepcion, Santa Barbara County
Founded December 8, 1787



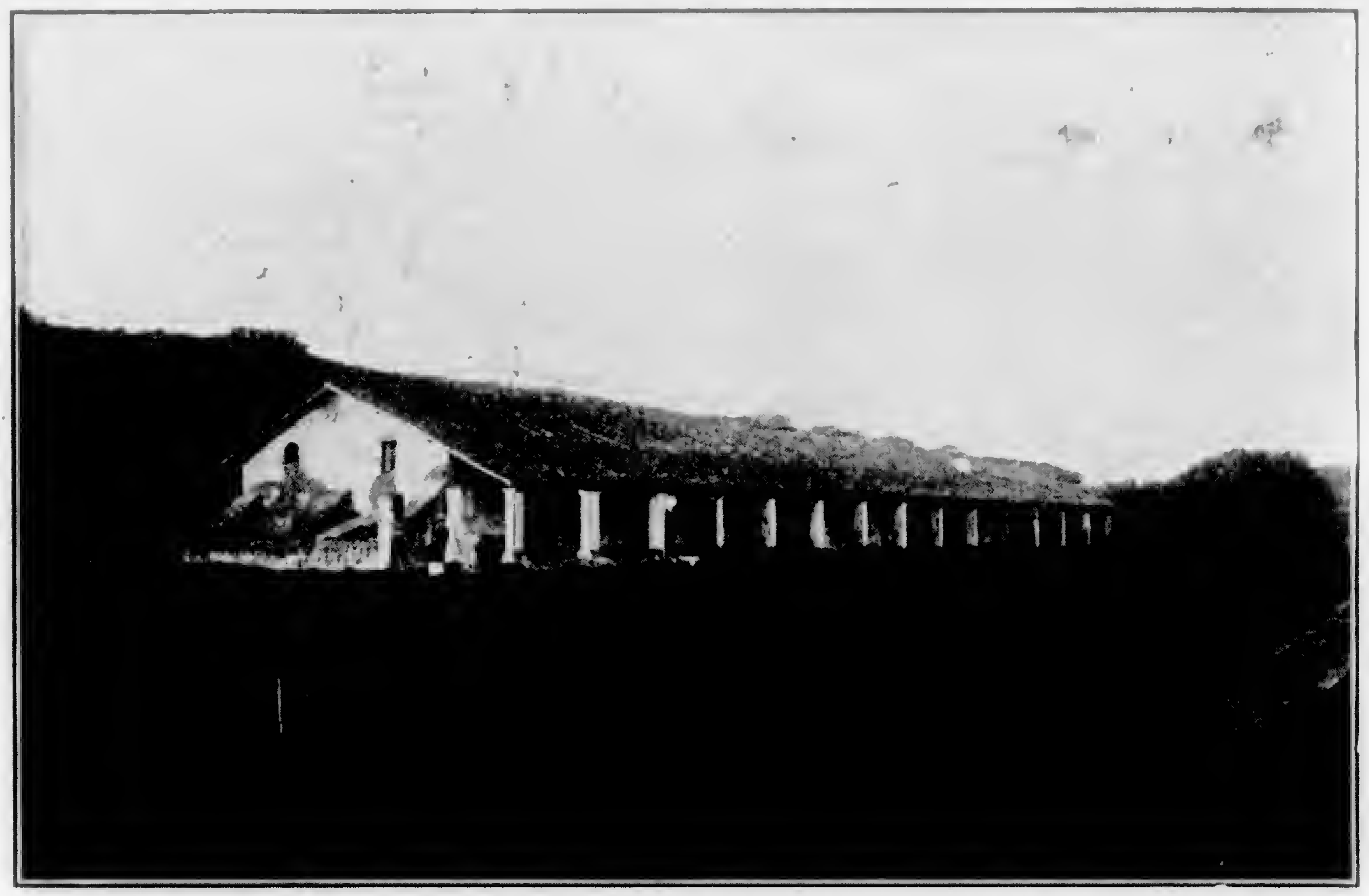
San Miguel Arcangel, San Luis Obispo County
Founded July 25, 1797



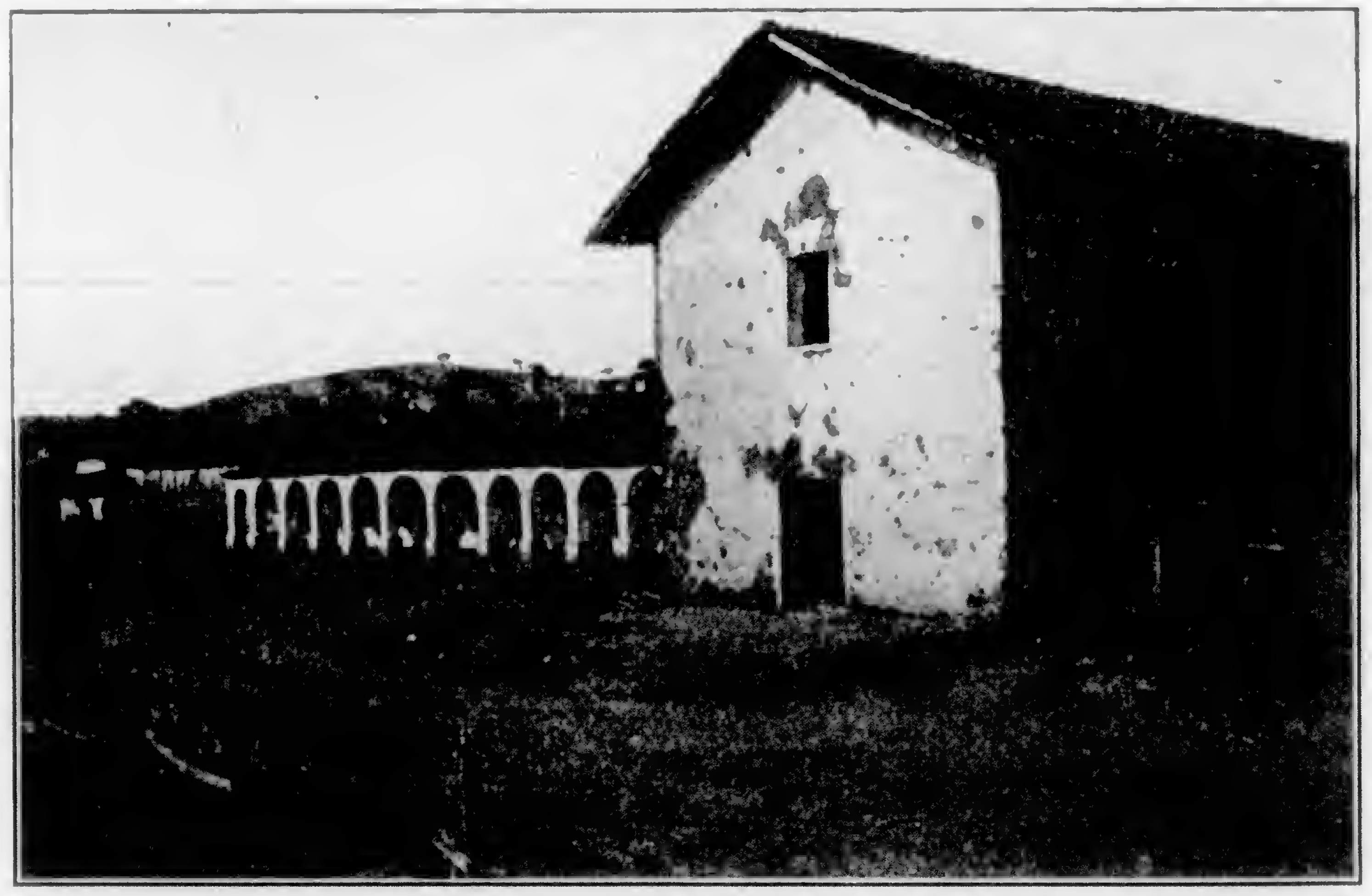
San Juan Bautista, San Benito County
Founded June 24, 1797



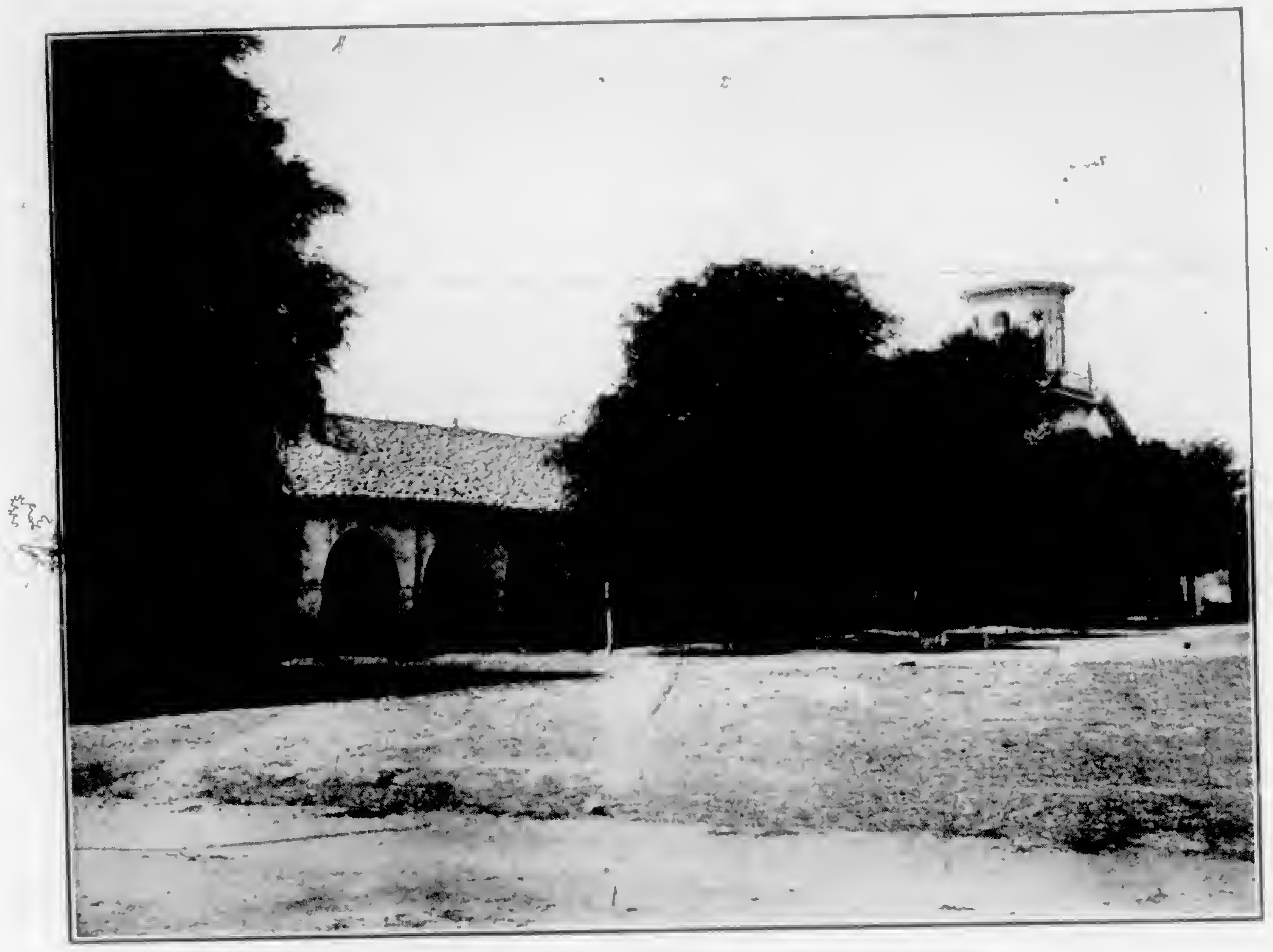
San Diego De Alcalá, San Diego County
Founded July 16, 1769



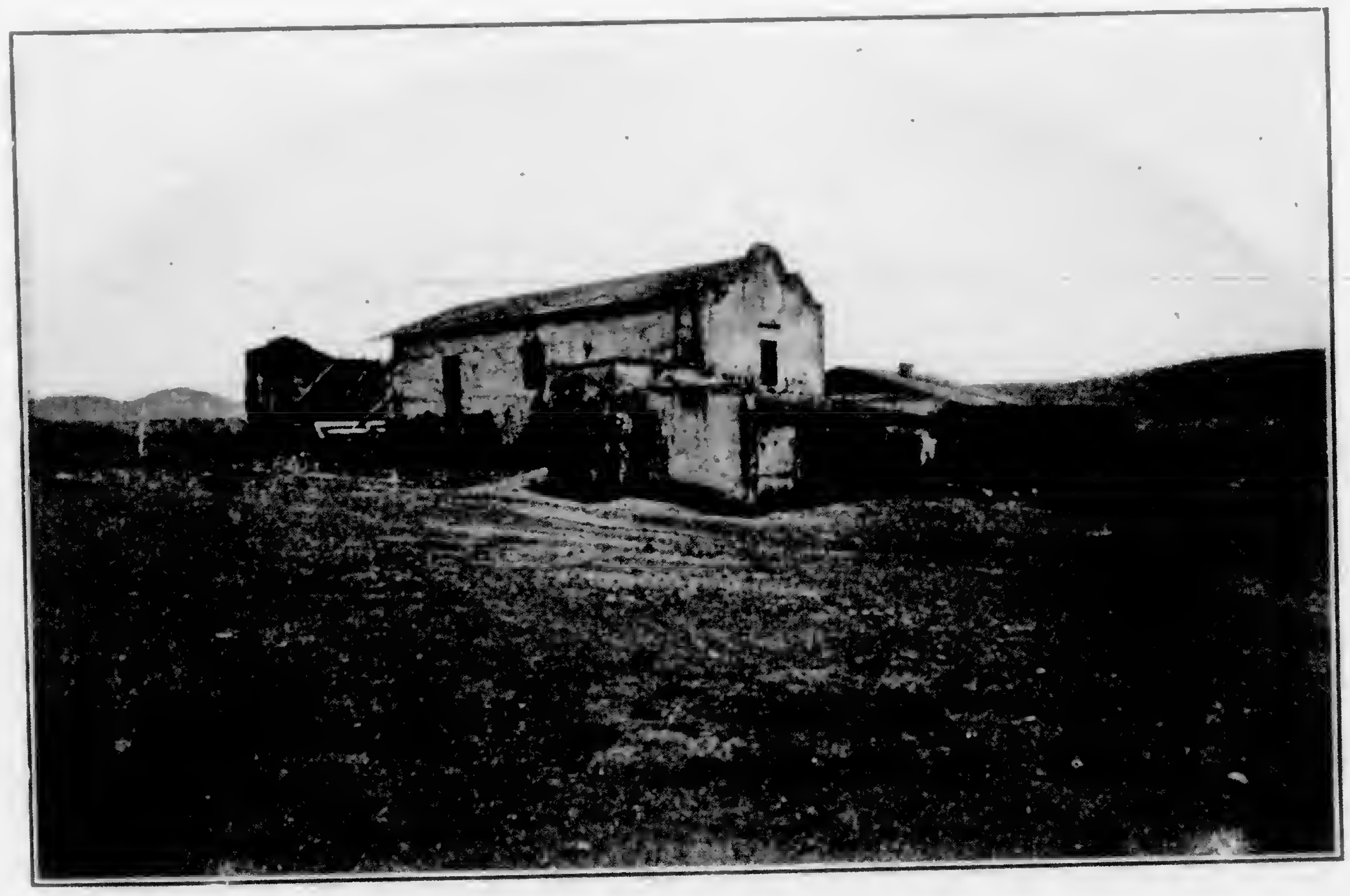
La Purisima Concepcion, Santa Barbara County
Founded December 8, 1787



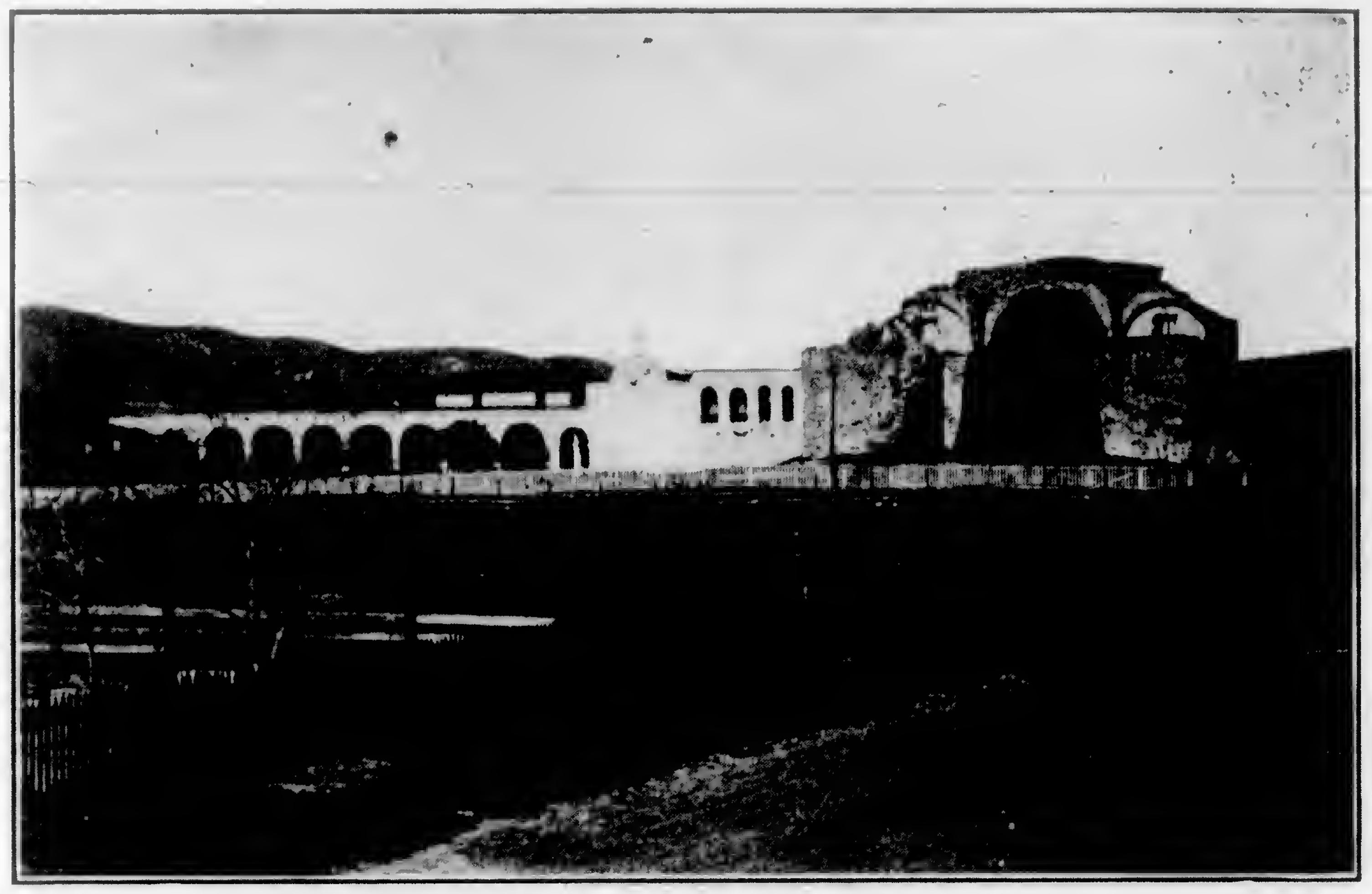
San Miguel Arcangel, San Luis Obispo County
Founded July 25, 1797



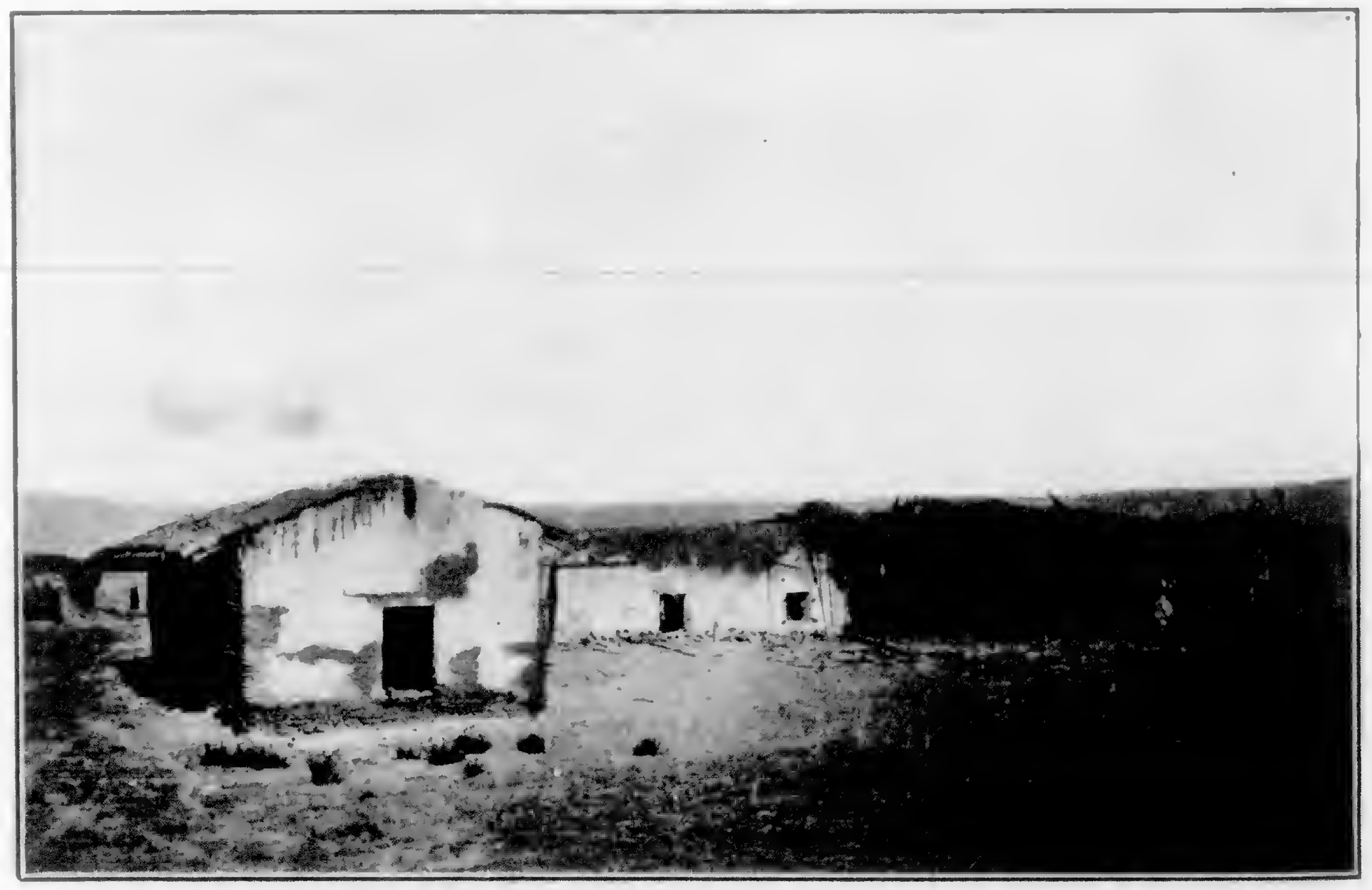
San Juan Bautista, San Benito County
Founded June 24, 1797



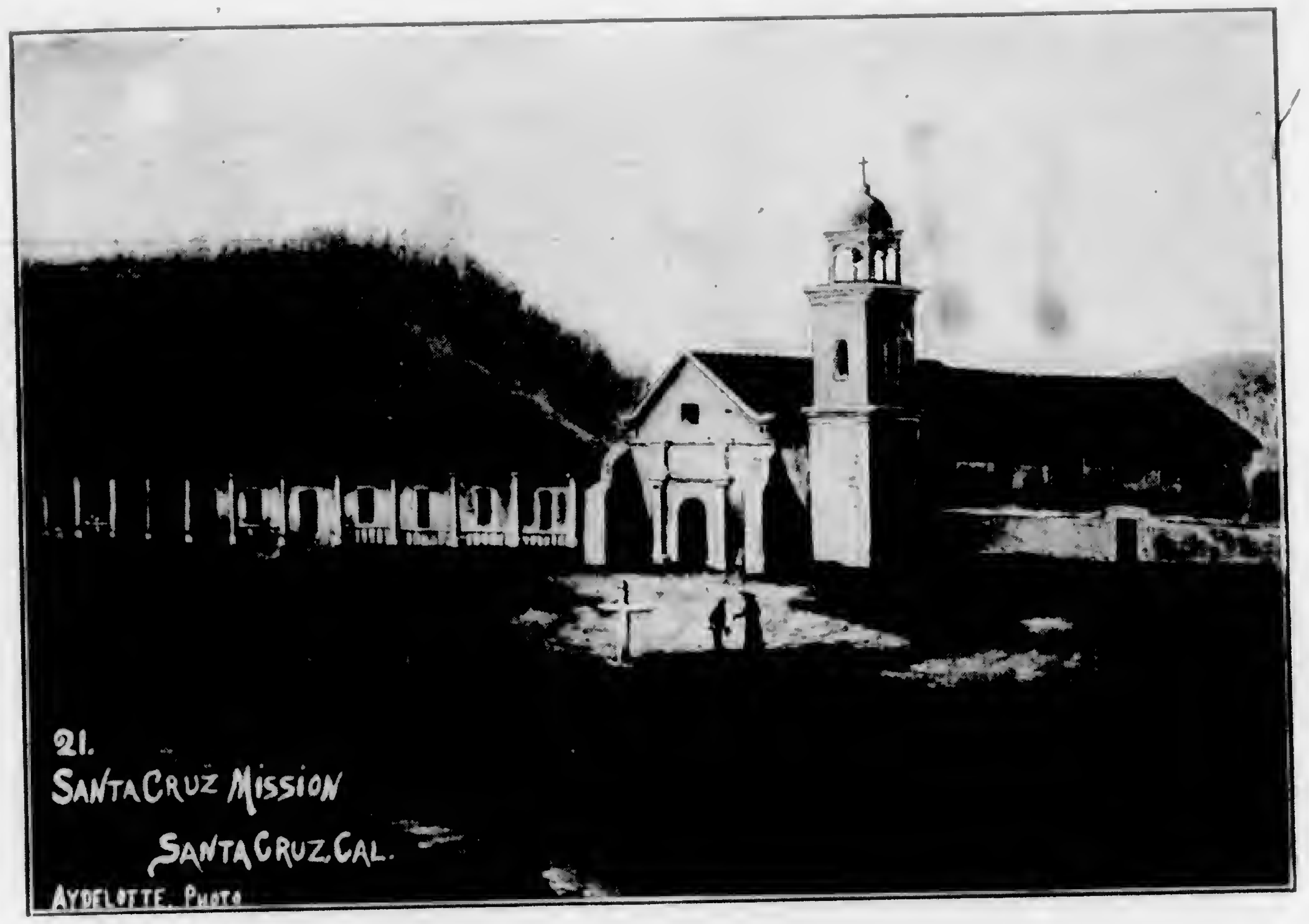
San Diego De Alcala, San Diego County
Founded July 16, 1769



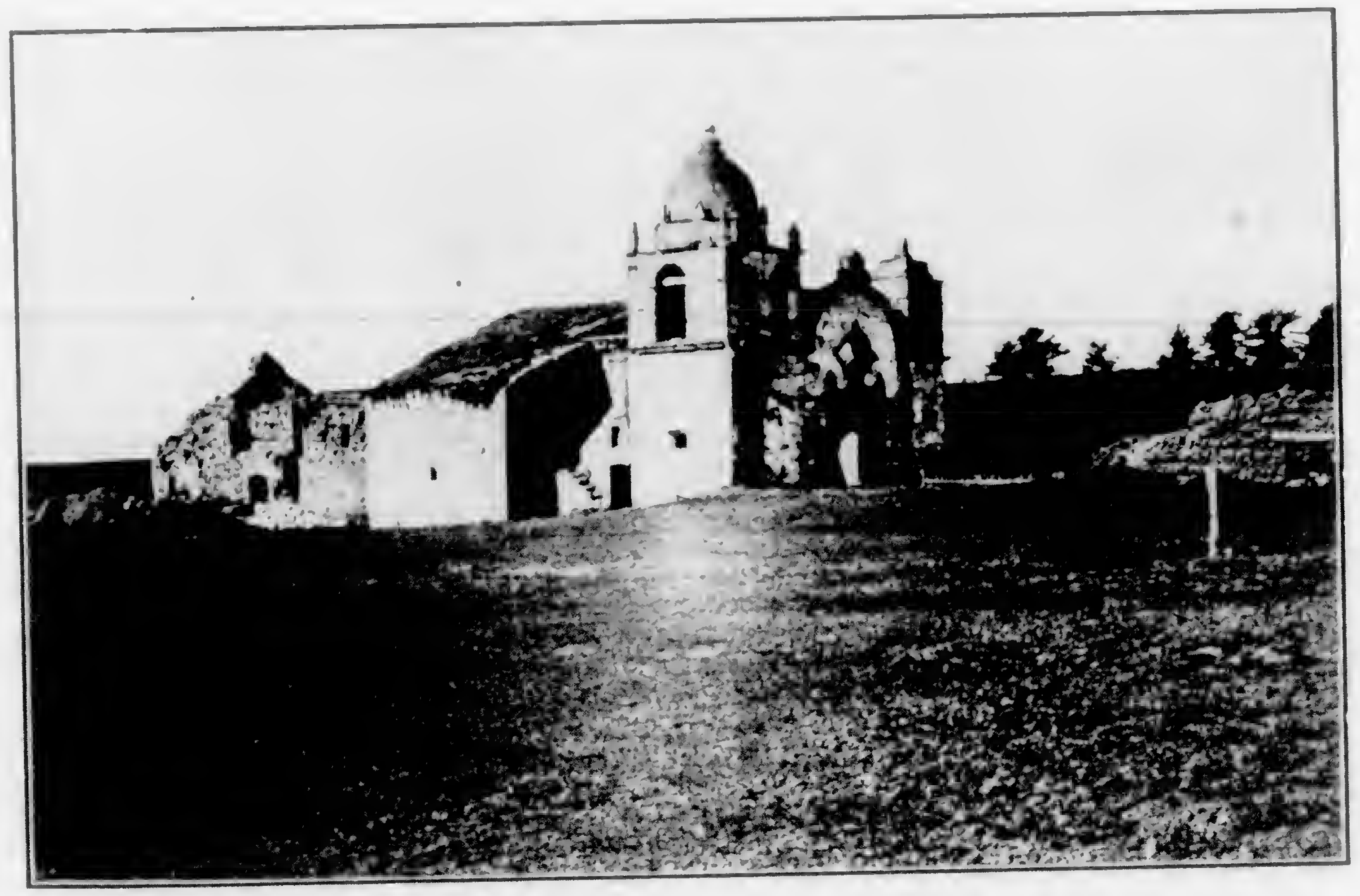
San Juan Capistrano, Orange County
Founded November 1, 1776



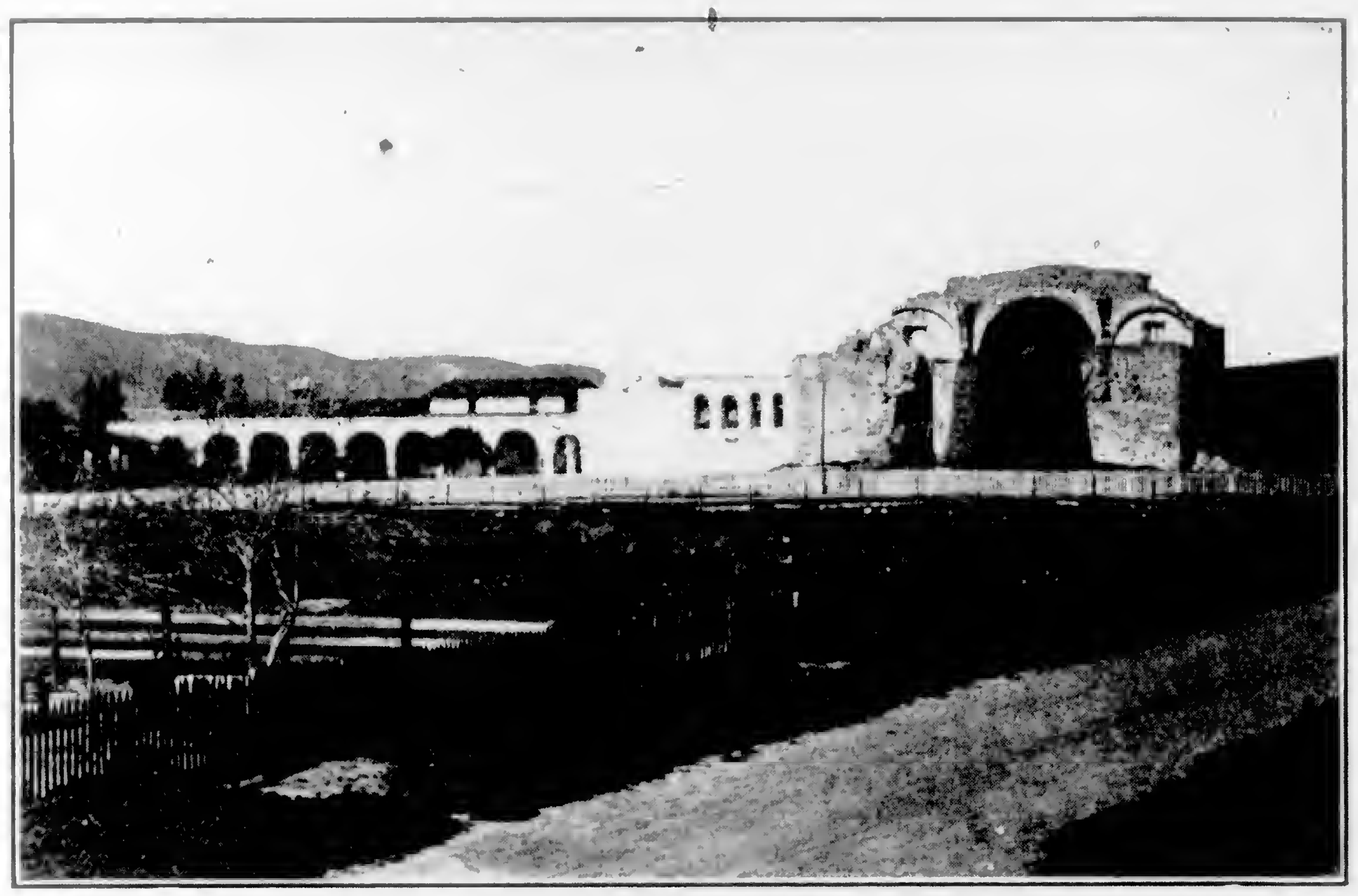
La Soledad, Monterey County
Founded October 9, 1791


21.
SANTA CRUZ MISSION
SANTA CRUZ CAL.
AYDELOTTE, PHOTO

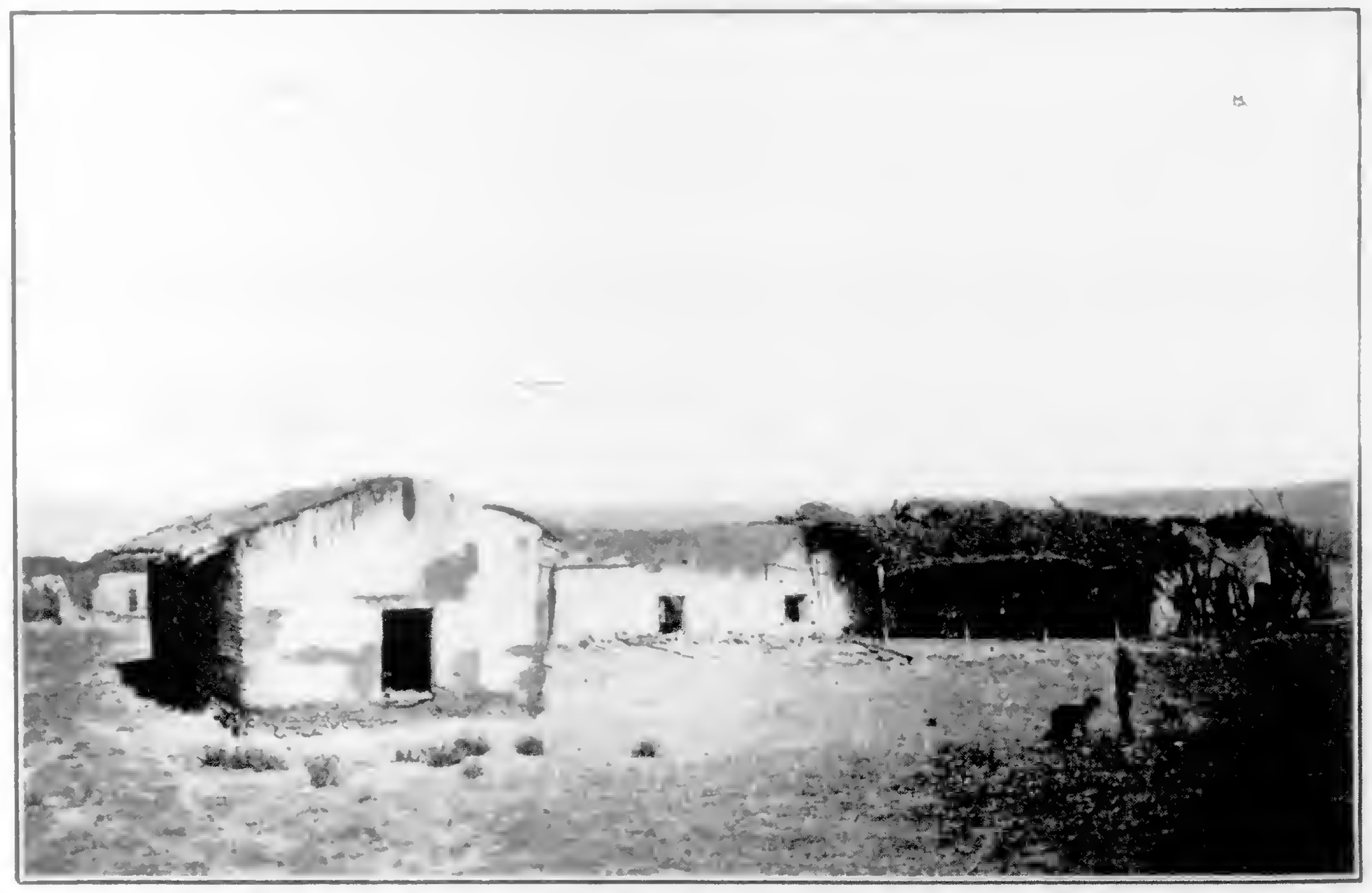
Santa Cruz, Santa Cruz County
Founded August 28, 1791



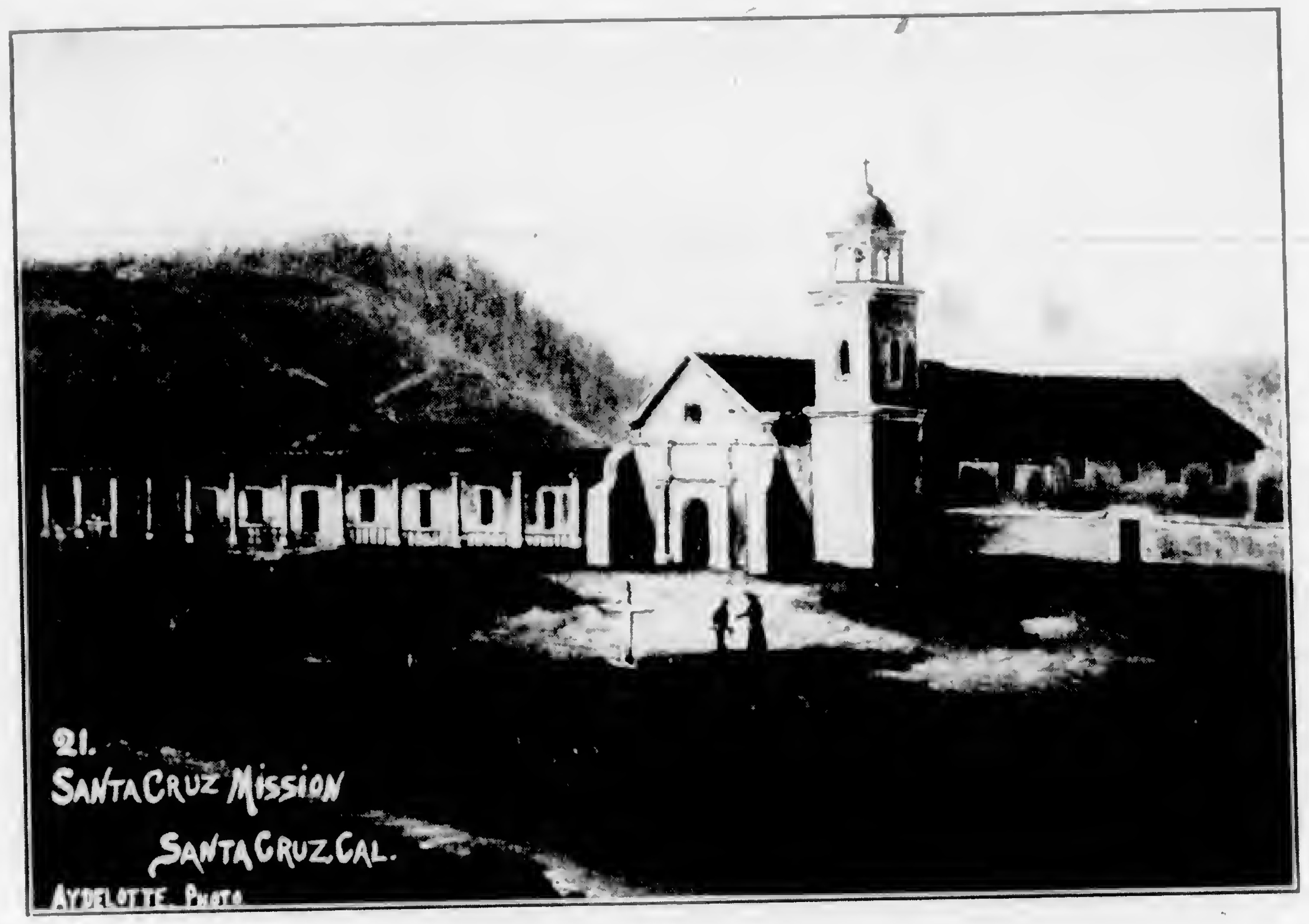
San Carlos Borromeo (Carmel) Mission, Monterey County
Founded June 3, 1770



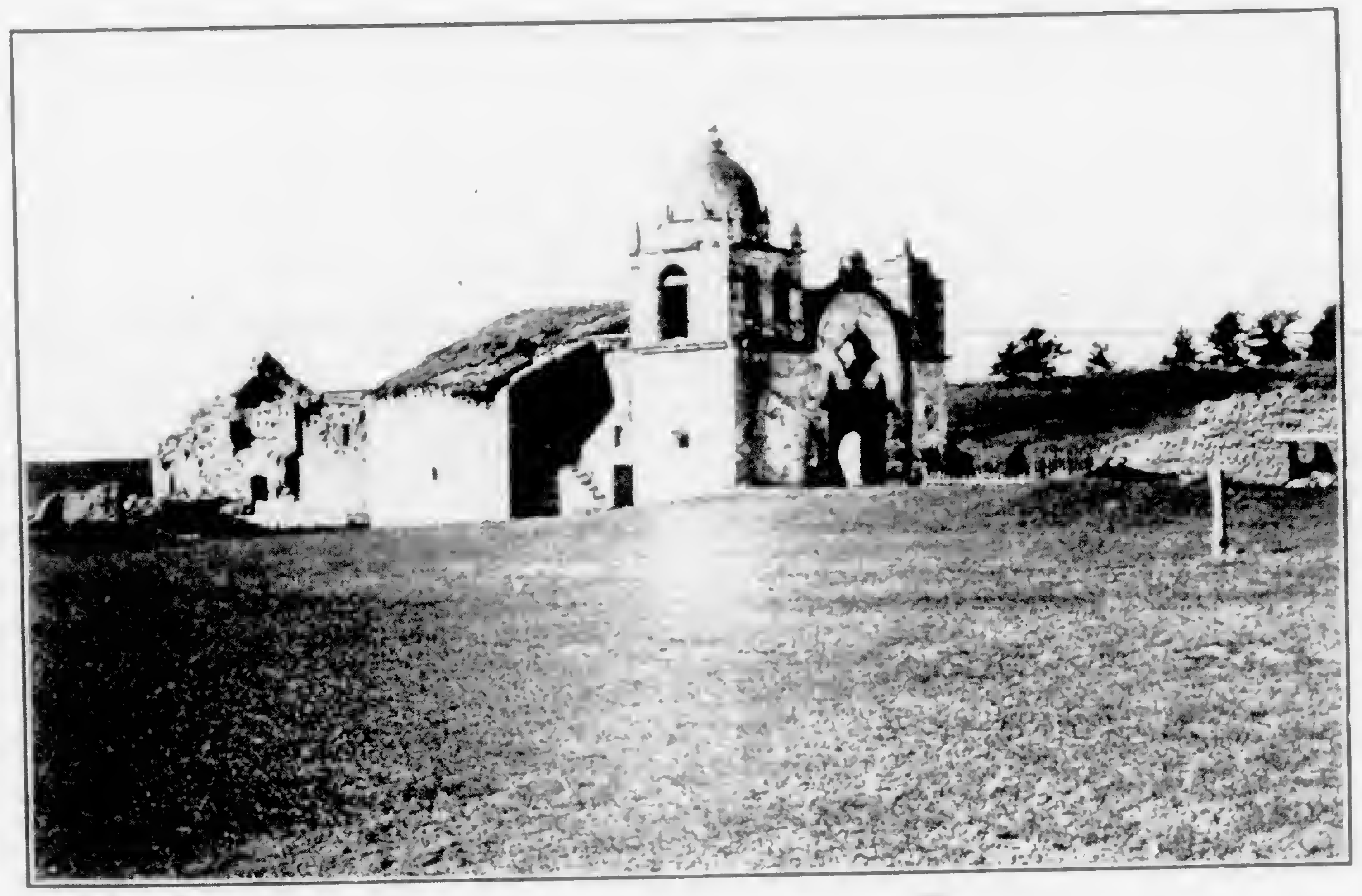
San Juan Capistrano, Orange County
Founded November 1, 1776



La Soledad, Monterey County
Founded October 9, 1791

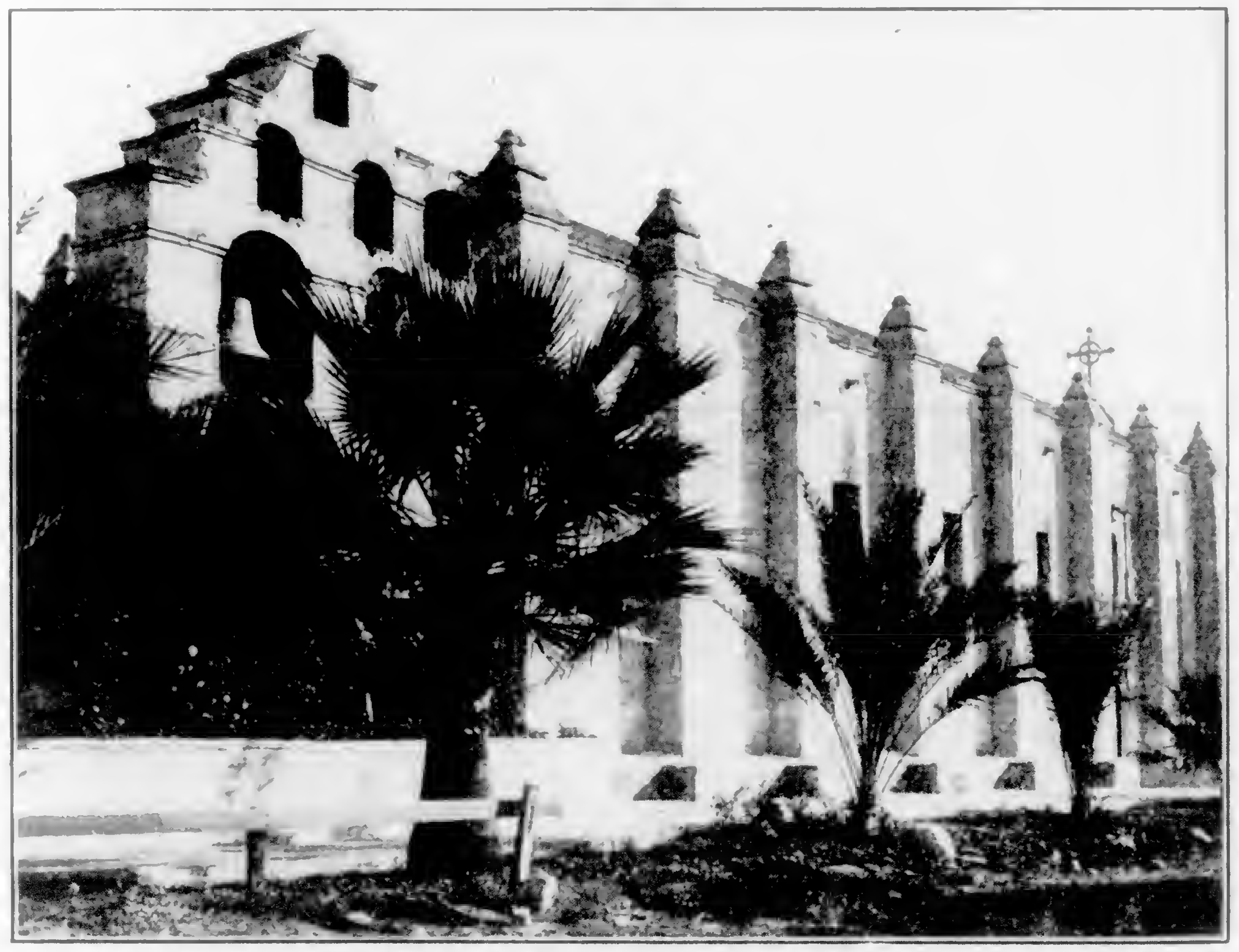

21.
SANTA CRUZ MISSION
SANTA CRUZ CAL.
AYDELOTTE PHOTO

Santa Cruz, Santa Cruz County
Founded August 28, 1791



San Carlos Borromeo (Carmel) Mission Monterey County
Founded June 3, 1770

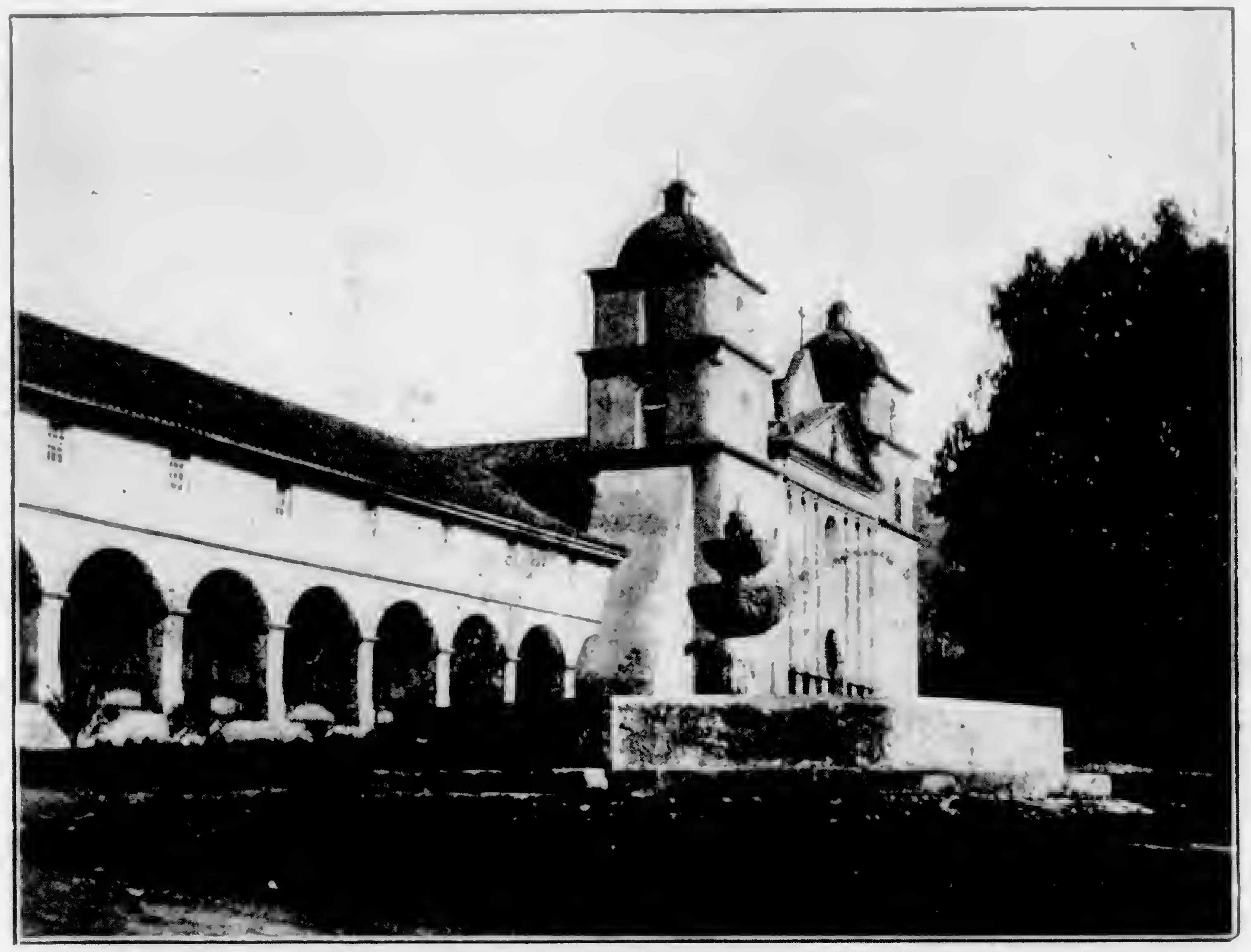
Santa Barbara, Santa Barbara County
Founded December 4, 1786



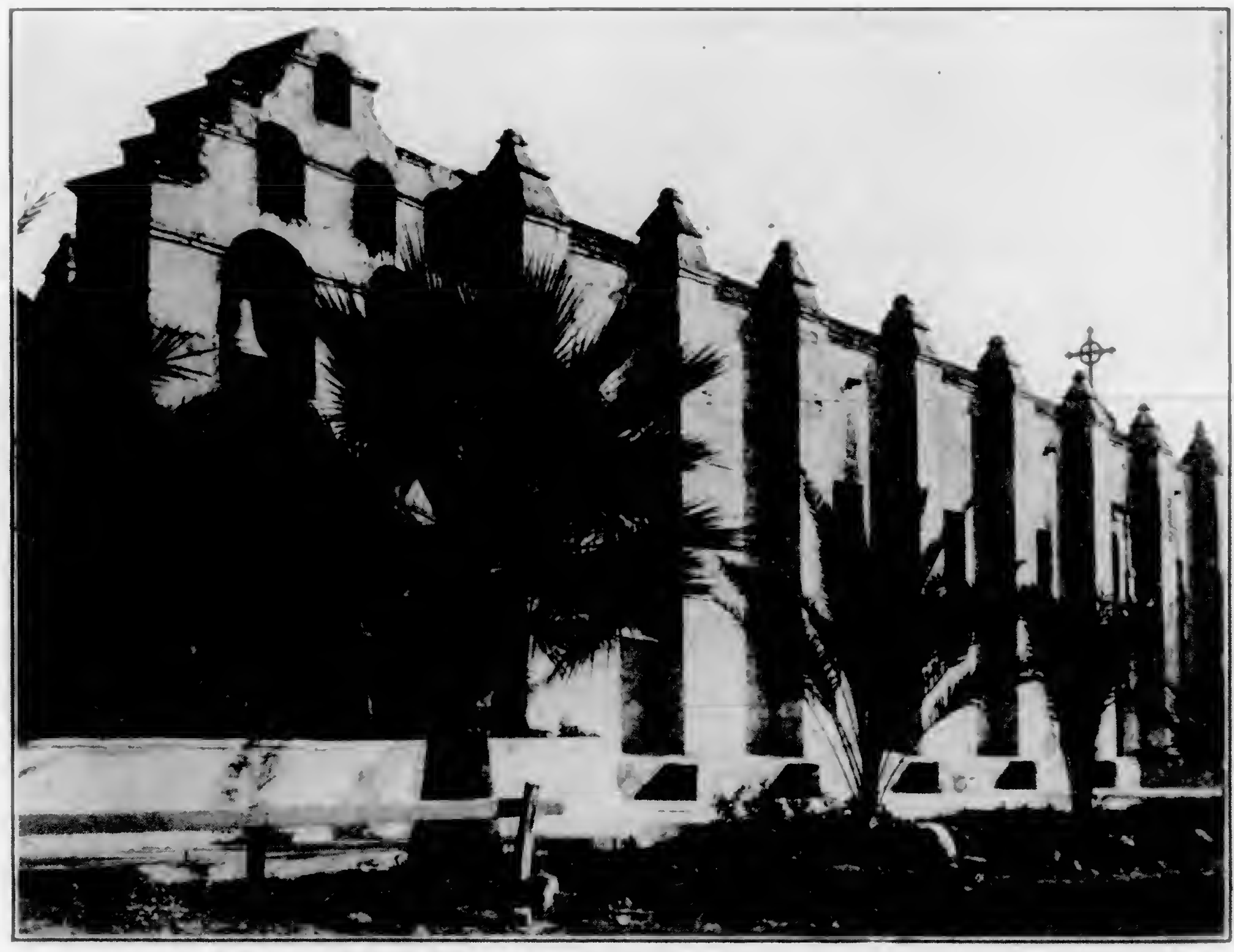
San Gabriel Arcangel, Los Angeles County
Founded September 8, 1771

San Francisco De Asis (Dolores) San Francisco
Founded October 9, 1776

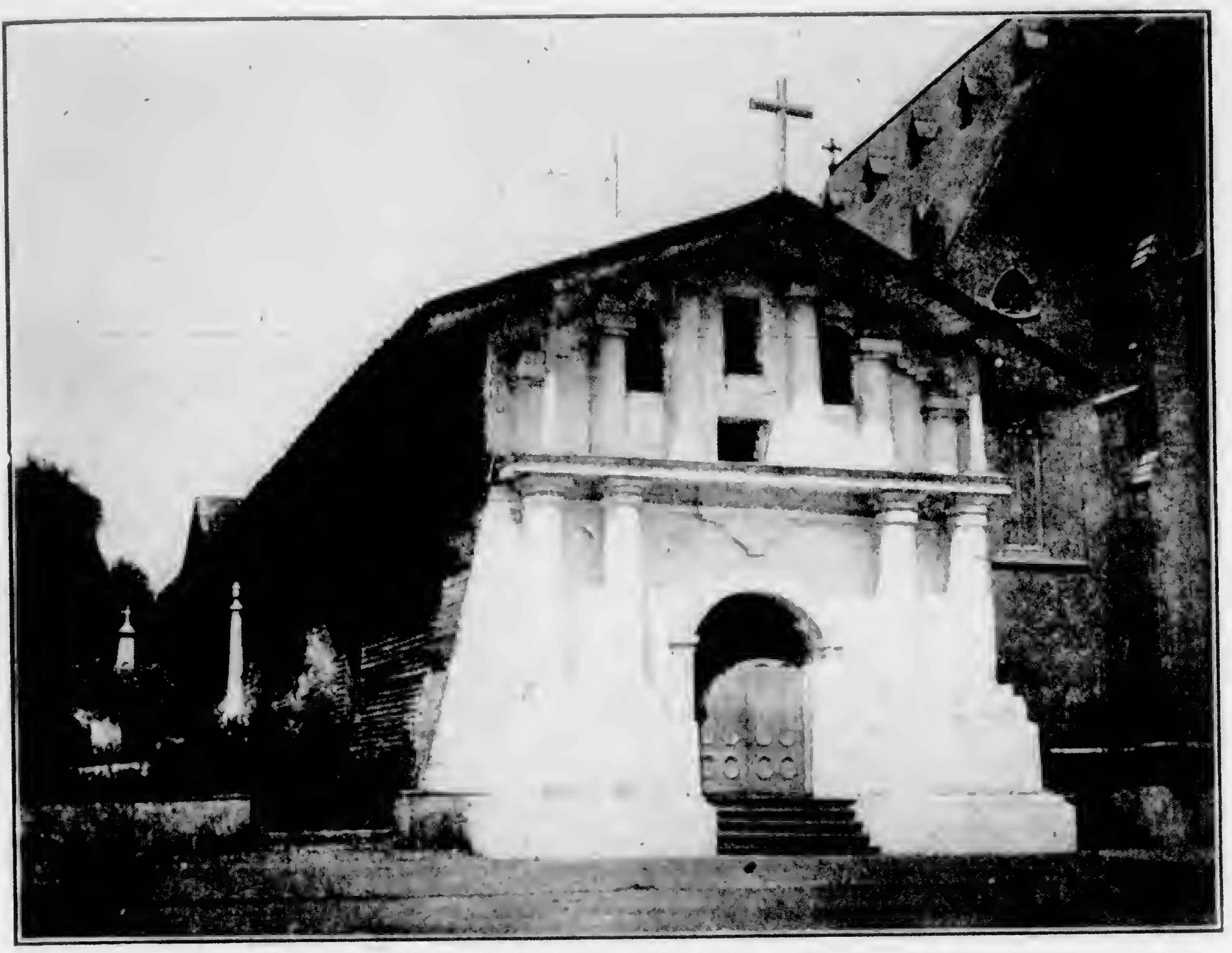
San Antonio De Padua, Monterey County
Founded July 11, 1771



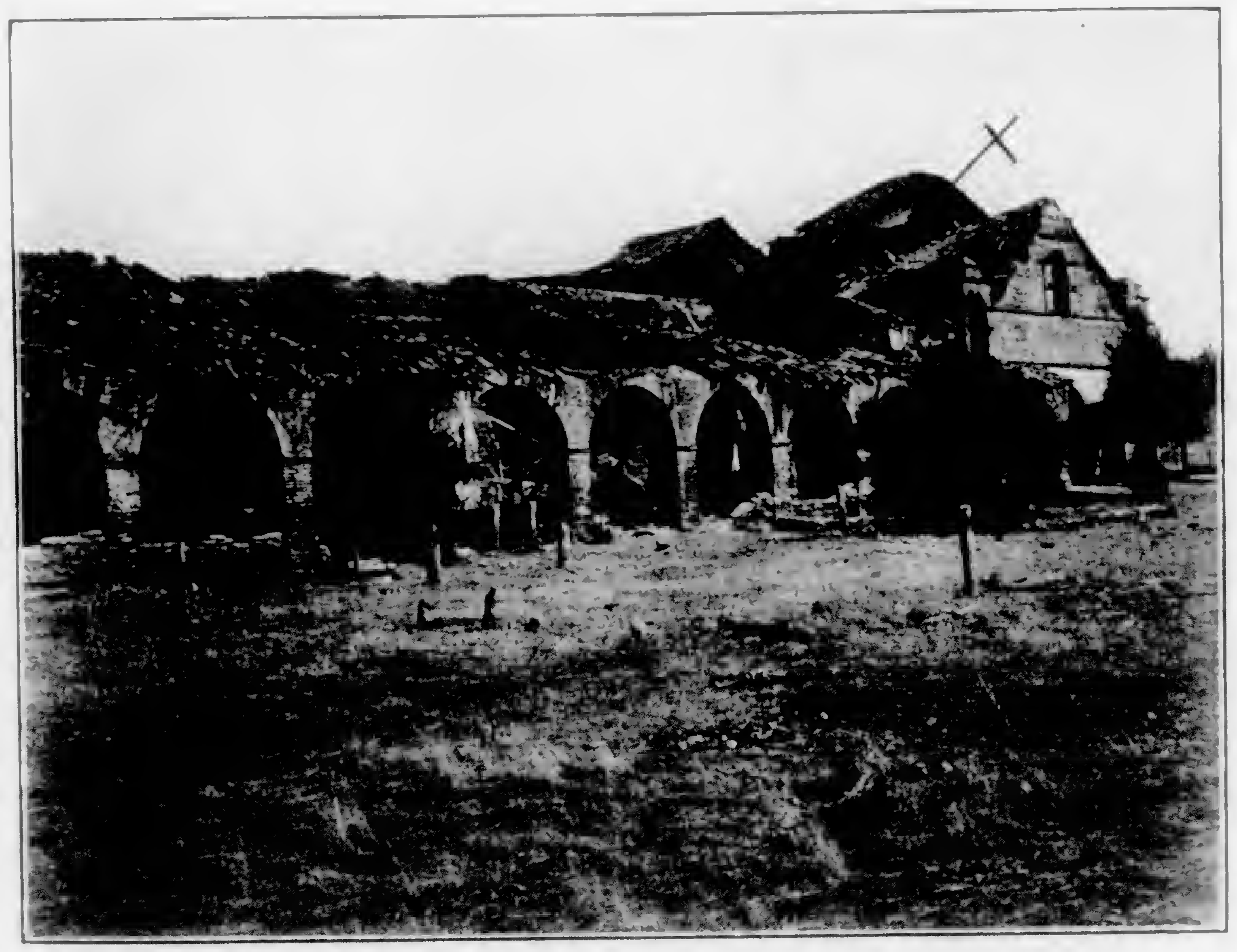
Santa Barbara, Santa Barbara County
Founded December 4, 1786



San Gabriel Arcangel, Los Angeles County
Founded September 8, 1771



San Francisco De Asis (Dolores) San Francisco
Founded October 9, 1776



San Antonio De Padua, Monterey County
Founded July 14, 1771

(Dolores) mission, in San Francisco, withstood the earthquake and conflagration of 1906, the modern church adjoining suffering great damage.

These old missions should be preserved. Over one hundred years have come and gone since the passing of the mission system, and each year Californians are becoming more impressed with the importance of preserving these reminders of the days of Spanish rule and monuments to those self-sacrificing padres who labored unceasingly for the betterment of the Indians, facing the greatest difficulties, enduring hardships, and in many instances sacrificing their lives.

* * *

The Strength of Structural Timber

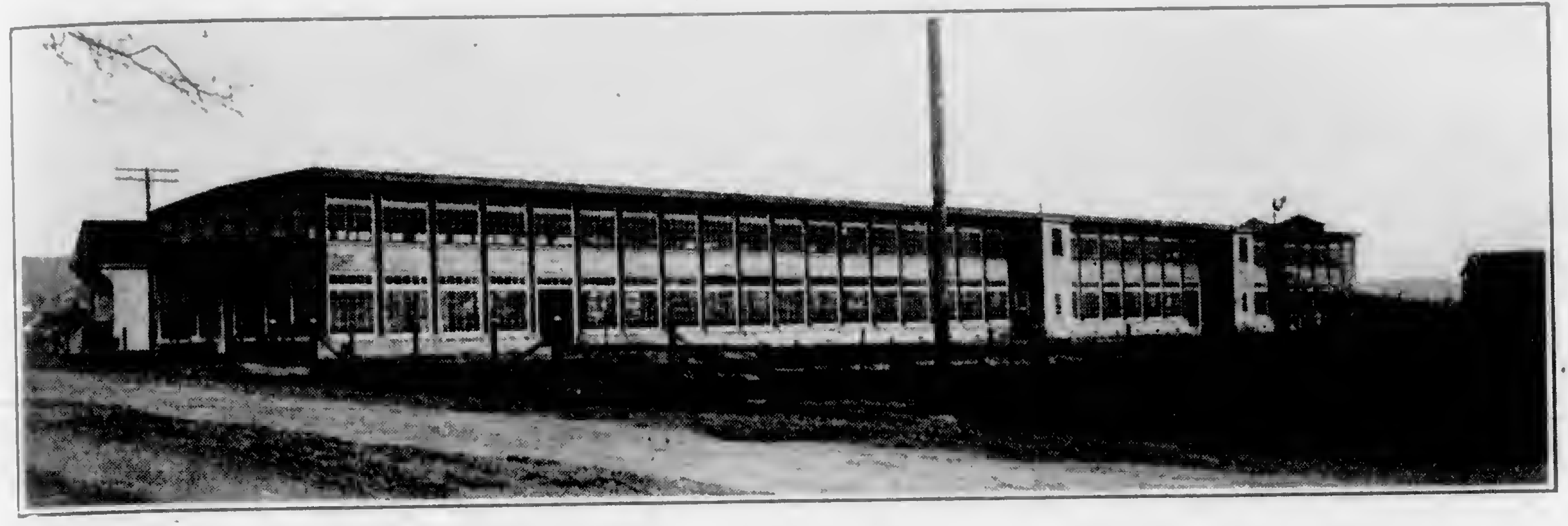
BEFORE putting a timber into a structure every builder must know the strength of the timber and the maximum load it will have to carry. Building laws generally require that the material used shall be from three to six times as strong as is actually necessary.

Loblolly, longleaf, and Norway pines and tamarack are among the principal structural timbers of the eastern United States, and Douglas fir and western hemlock of the western. In the trade, loblolly pine is classed both as Virginia pine and as North Carolina pine. Virginia pine is made up principally of material from the northern part of the loblolly pine belt, and is inferior in quality to the North Carolina pine, so that the distinction is one of grade rather than one of locality. Longleaf yellow pine as known on the market may include the better grades of shortleaf pine and Cuban pine. It has for a long time been the standard construction timber of the East. Norway pine, also known as red pine, is lumbered principally in Michigan, Wisconsin, and Minnesota, where it is marketed with white pine as northern pine. Douglas fir, called in different localities yellow fir, red fir, Oregon pine, and Douglas spruce, is cut most extensively in Washington and Oregon. Western hemlock, which is obtained from the same region, suffers from the reputation of the eastern hemlock, but is far superior for structural purposes. On account of the prejudice against it, it is often sold under such names as Alaska pine and Washington pine, spruce, or fir.

Recent tests by the Forest Service show longleaf pine to be the strongest and stiffest of all the timbers named, with Douglas fir a close second; while western hemlock, loblolly pine, tamarack, and Norway pine follow in the order given. Fortunately, Douglas fir and western hemlock, of which there are comparatively large supplies, have high structural merit, as has also loblolly pine, the chief tree upon which the southern lumber companies are depending for future crops.

Much of the information hitherto available concerning the strength of timber has been secured from tests of small pieces without defects. This can not safely be assumed to hold good for large-sized timbers as found on the market, since these commonly contain such defects as checks, knots, cross grain, etc. The location of the defects varies the extent to which they lessen its strength; and the proportion of heart and sap wood, and the state of seasoning, must also be considered.

Circular 115 of the Forest Service, just issued, gives the results of tests that have been conducted during the past four years at timber-testing laboratories in different parts of the country. This circular will be mailed upon application to The Forester, Forest Service, Washington, D. C.



Oakland Cotton Mills, Melrose, Cal.

Ransome Construction in California*

By C. W. WHITNEY

IN NOTING some of the recent reinforced concrete work in California, constructed in accordance with the Ransome system, it is interesting to refer to the early work of Mr. Ernest L. Ransome in the vicinity of San Francisco. Mr. Ransome came from England to California in 1872 and for five years was engaged in concrete construction for Alvinza Hayward. During this period, he developed, among other features, the Ransome cold-twisted steel bar which is now used so generally for concrete reinforcement. In 1888 the Alameda Borax Works was built by Mr. Ransome, it being the first reinforced concrete factory ever constructed in this country. It is an all-concrete structure, foundations, columns, walls, floors and roof, all being of reinforced concrete. Its dimensions are 180 feet by 40 feet, and the floors, constructed with twenty-foot spans, were built to sustain a load of 300 pounds per square foot. This building withstood the shock of the earthquake of April 18, 1906, without any damage. The accompanying illustration of the interior showing the construction was taken after the earthquake.

About five years after the construction of the Alameda factory, Mr. Ransome erected the Museum building and Roble Hall, the girl's dormitory, at Stanford University. Concerning the effect of the earthquake on these buildings, the following extract from the "Report of Stanford University Engineers on Injuries to Buildings at Palo Alto" is significant:

"The damage to Roble Hall is confined to the two holes torn in the floors by the falling chimneys. The remainder of the building shows practically no evidence of having passed through an earthquake.

"A feature of particular interest to engineers is the condition of the reinforced concrete buildings at the university. These buildings were erected thirteen years ago. . . . The work being among the earliest of Mr. Ernest L. Ransome with his now well-known twisted rod reinforcement.

"We append below a detailed statement furnished by Prof. Wing at our special request showing the nature of the damage to specific buildings, and accompanied by photographs. It will be seen from this statement that the two concrete buildings, notwithstanding the fact that their design and construction would nowadays be considered extremely crude, came through the earthquake in excellent shape."

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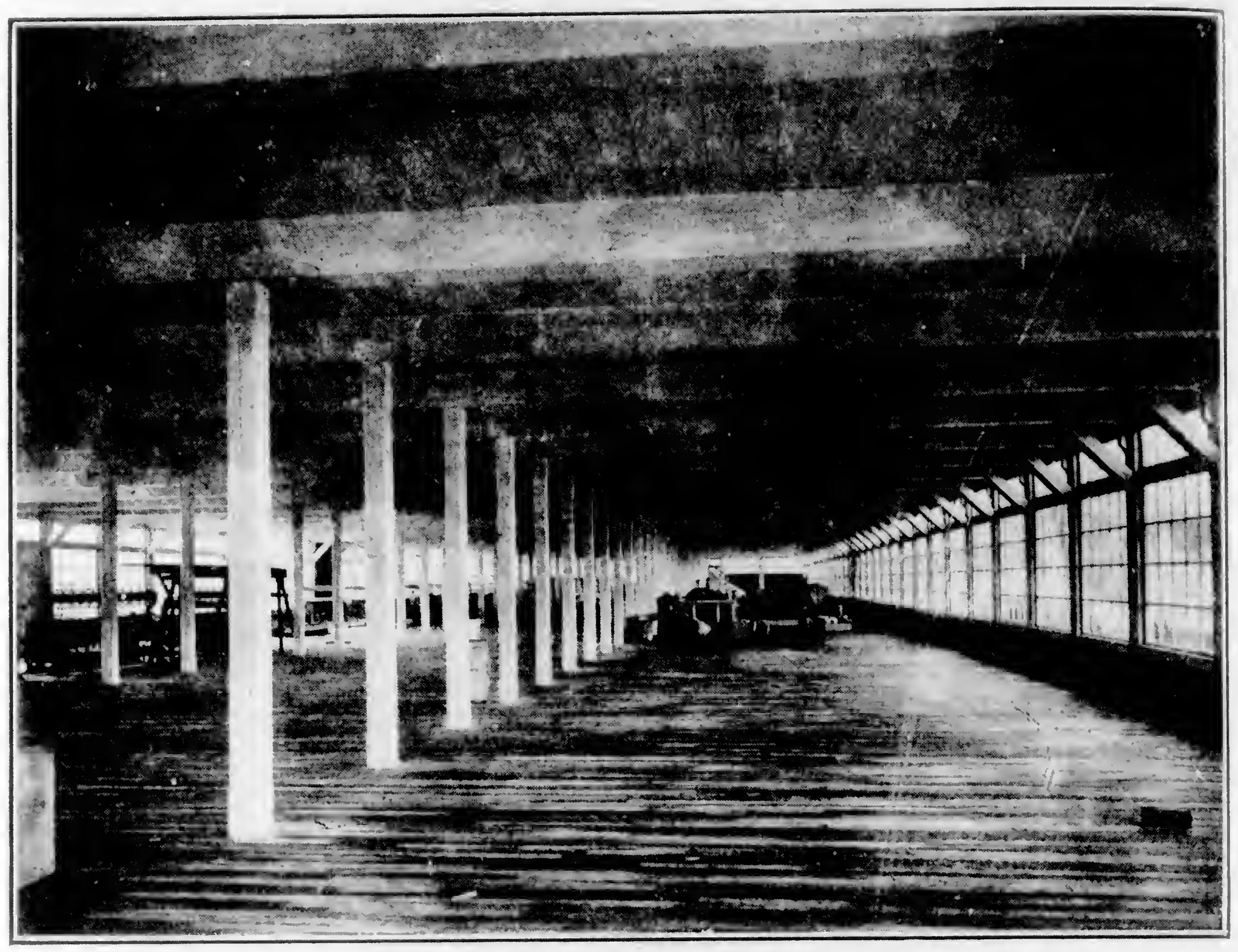
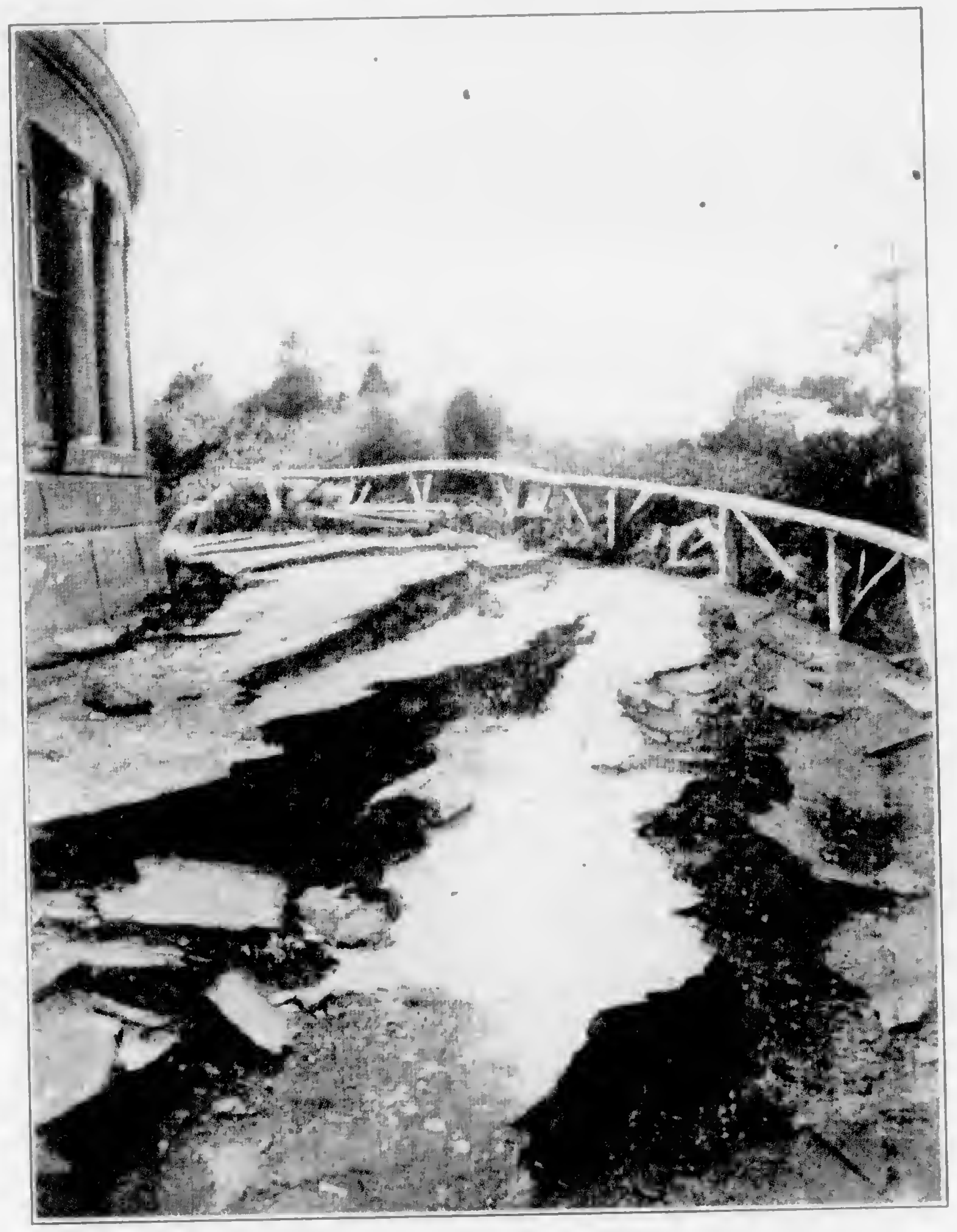
* The Ransome Concrete Company, of which Mr. Ernest L. Ransome is consulting engineer, has offices in the Crocker building, San Francisco.



Ground Floor Oakland Cotton Mills Building

Second Floor Oakland Cotton Mills Building



Slip of Foundation of Cyclorama, Strawberry Hill, Golden Gate Park

From Prof. Wing's statement:

"The museum building consists of the original building of concrete with wings of plastered brick of recent construction. The construction of the original building was described and illustrated in Engineering News, 1893, I, 162, and is undamaged. The library and gymnasium have heavy brick walls (four feet thick in some places) veneered with stone. These have been badly demolished, as shown by the photographs.

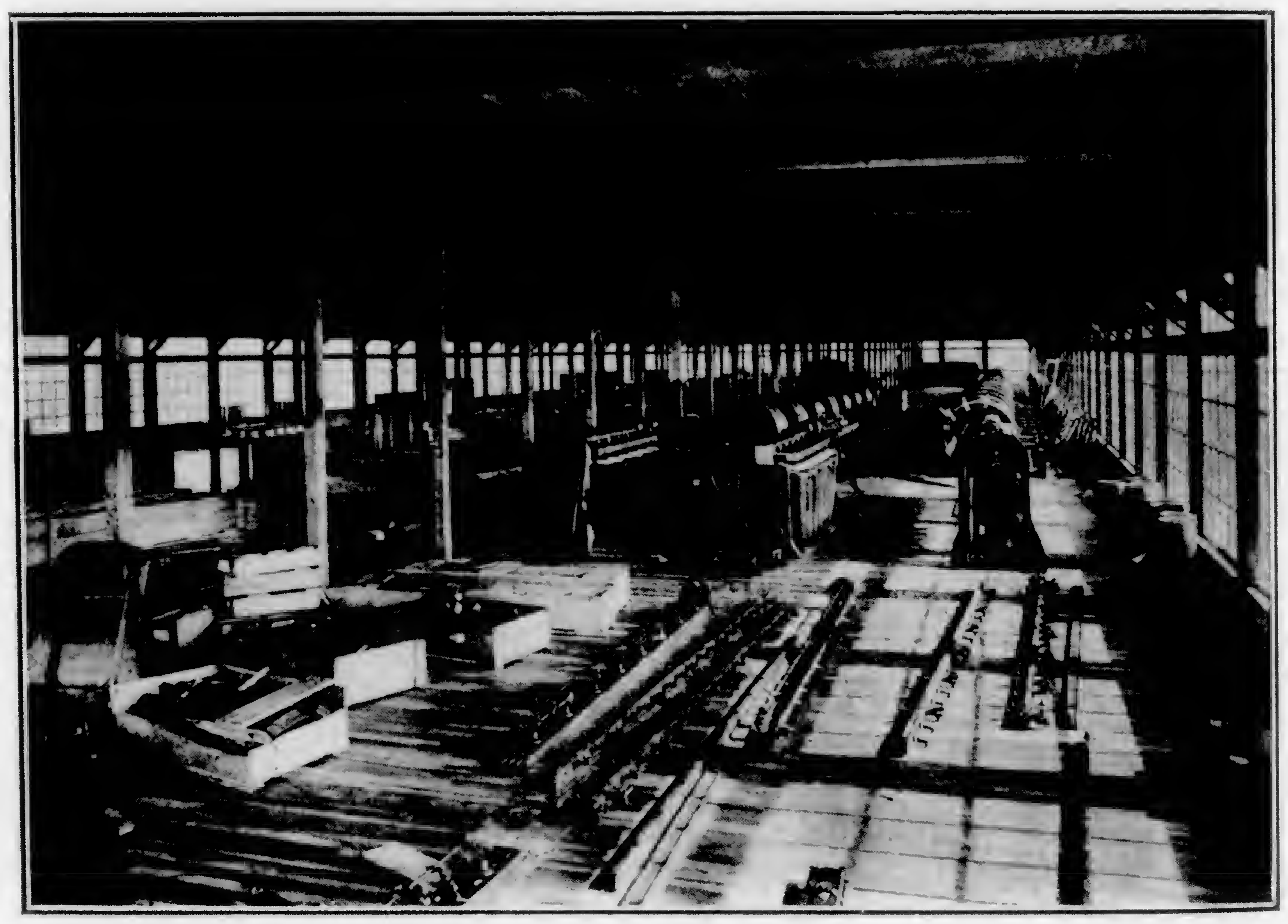
"Roble Hall, the woman's dormitory, is a monolithic concrete structure. The only effect of the earthquake on this building was to throw down two chimneys, which broke through the roof and two upper floors."

The following remarks of Richard L. Humphrey in his report to the Director of the U. S. Geological Survey by whom he was commissioned to investigate the effects of the earthquake and fire are also of interest in this connection:

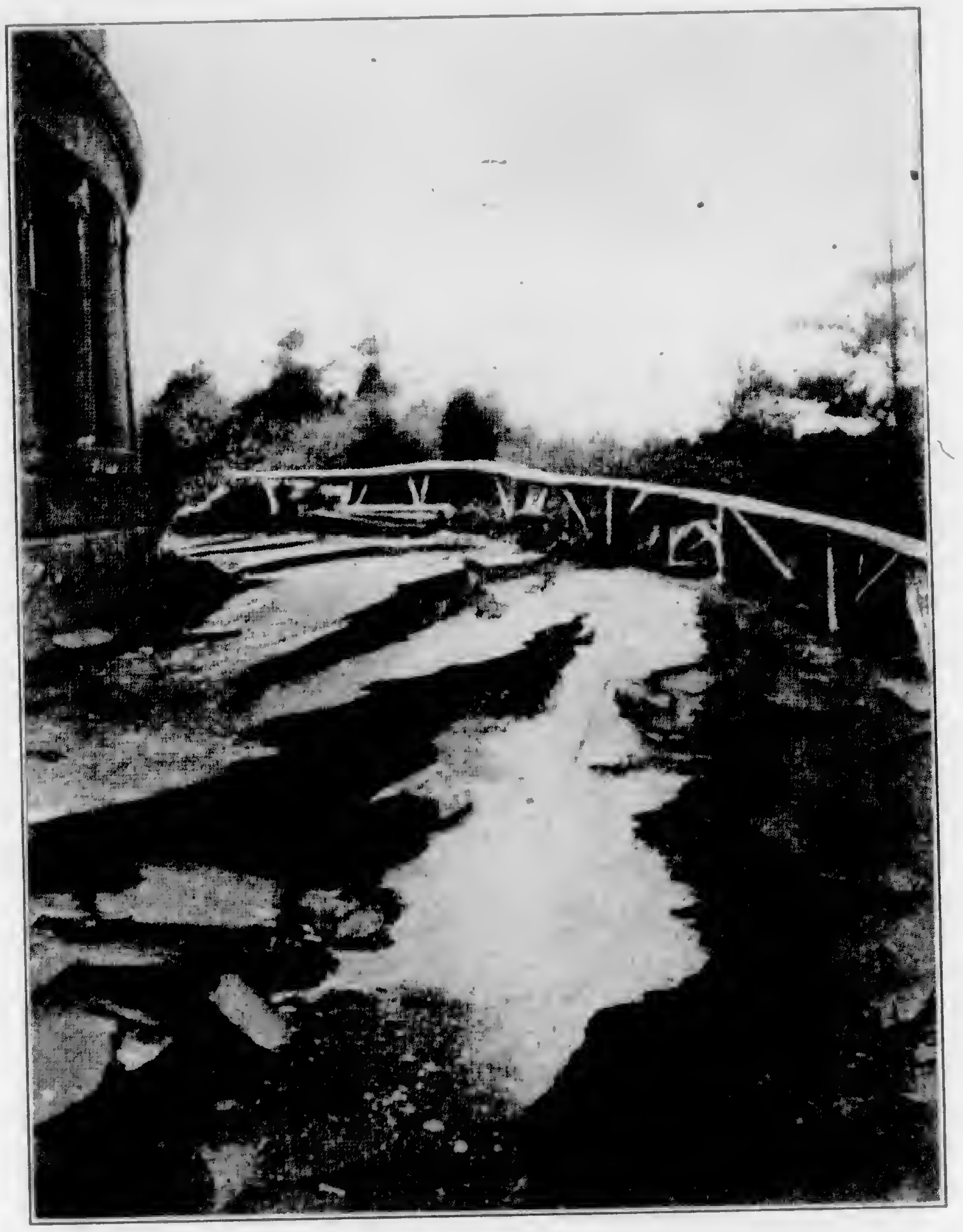
"The most interesting building is the museum, which consists of a central pavilion of reinforced concrete and wings of brick plastered with cement mortar. The columns of the central pavilion are solid concrete, having been cast in place. This building had wooden floors. The wings were wrecked by the earthquake, but the central pavilion escaped injury, although its contents were more or less damaged, principally by being shaken from their positions.

"Although the destruction at Stanford University was very great, the character of construction was fair and did not suffer by comparison

Ground Floor Oakland Cotton Mills Building



Second Floor Oakland Cotton Mills Building



Slip of Foundation of Cyclorama. Strawberry Hill. Golden Gate Park

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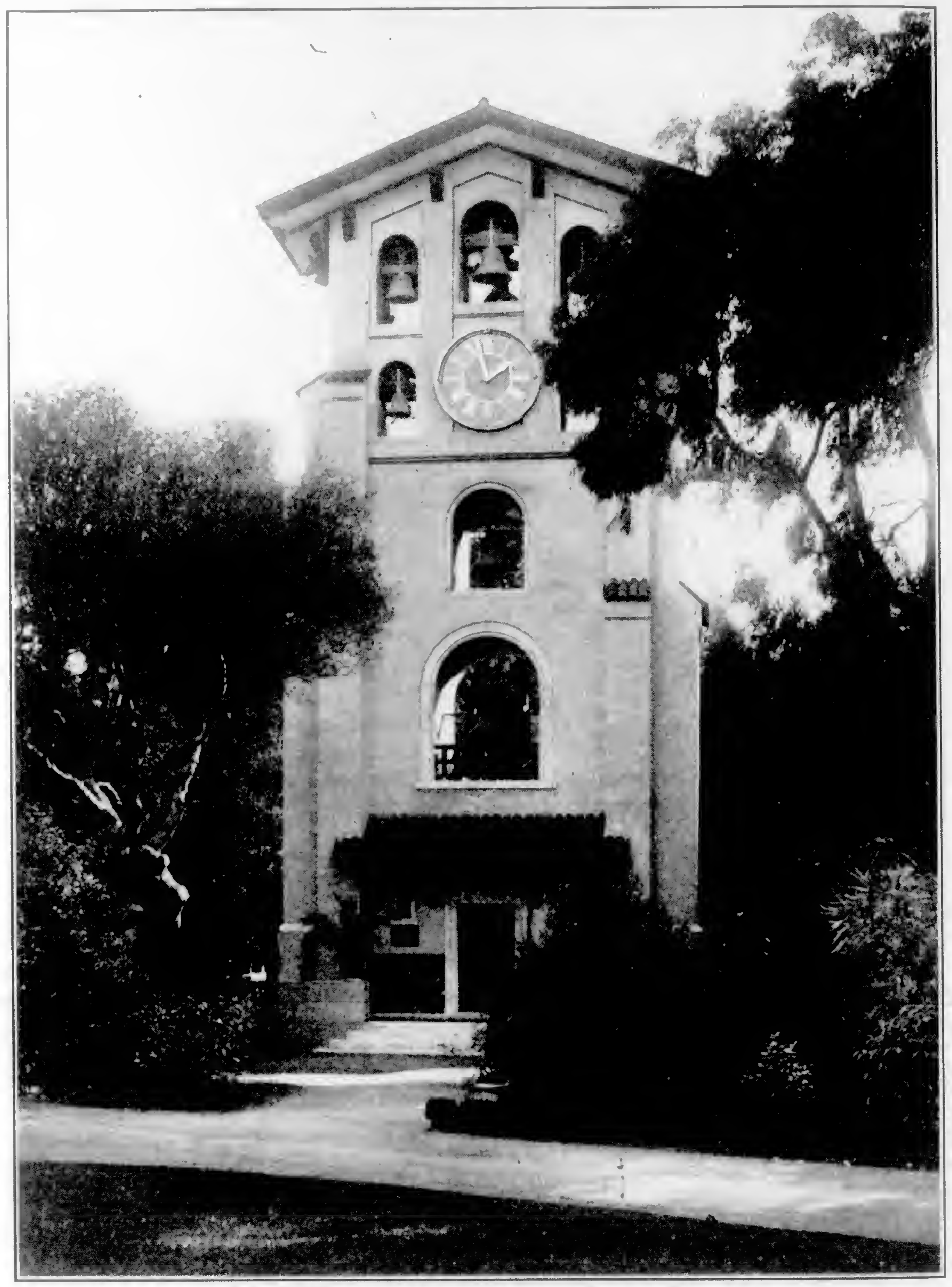
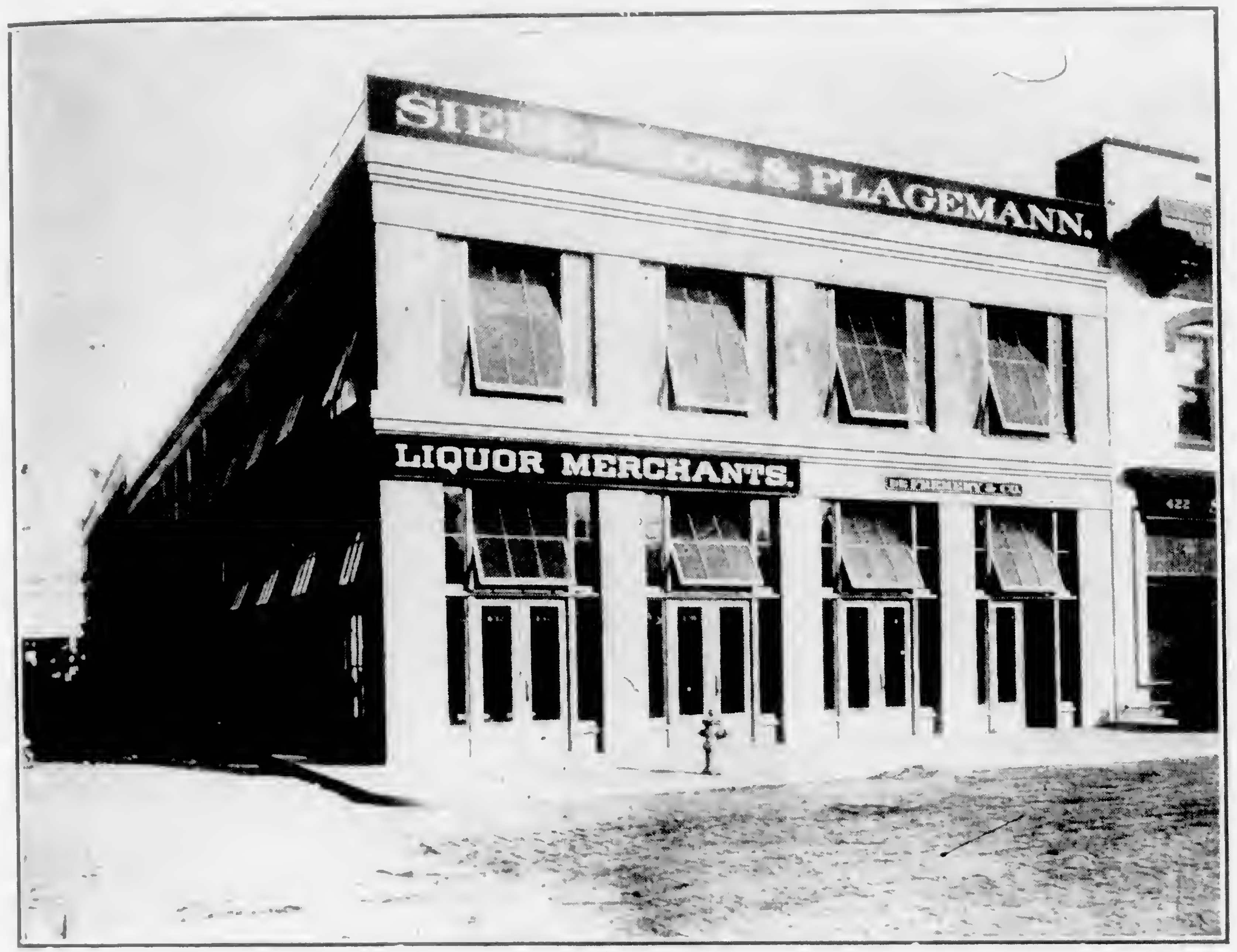
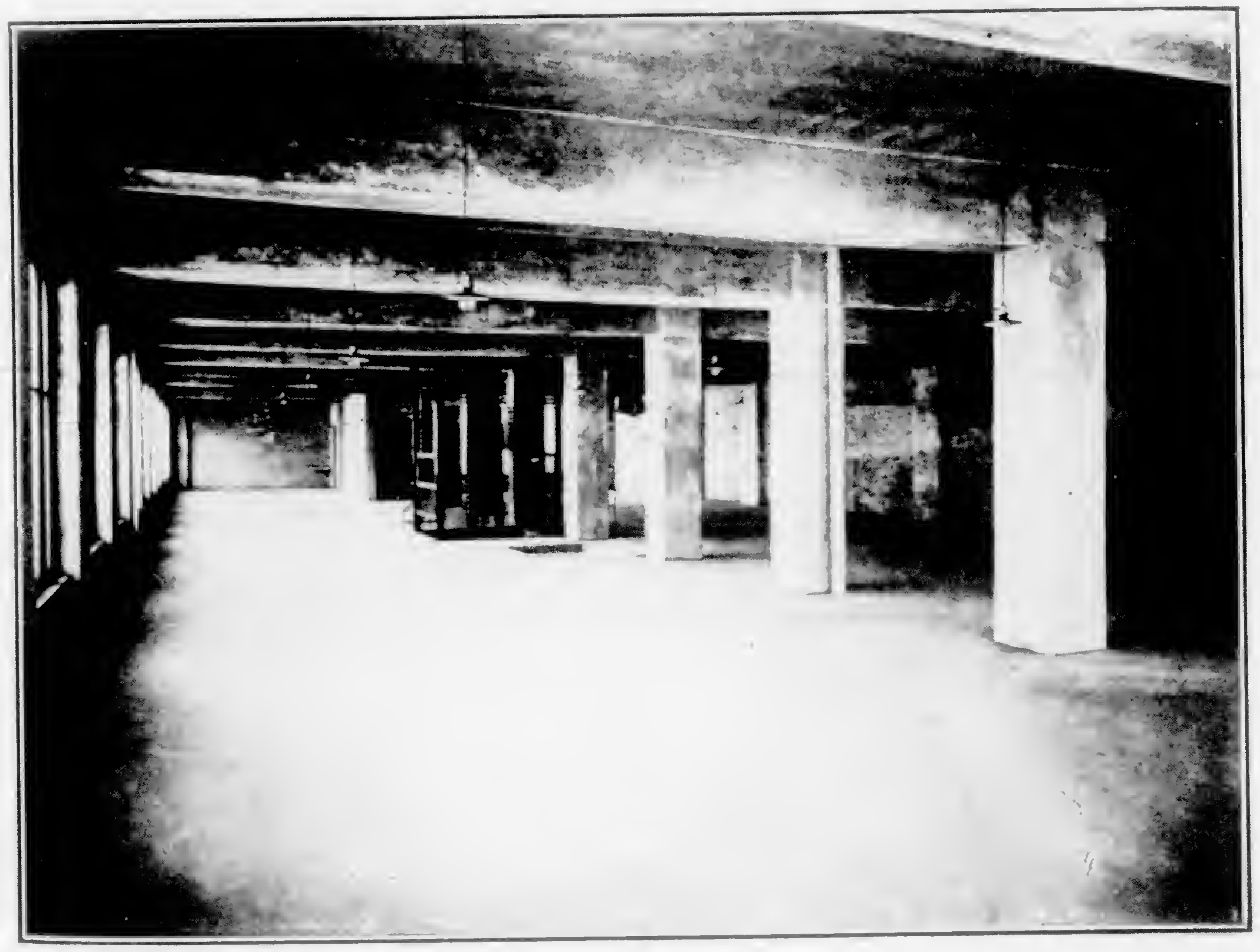


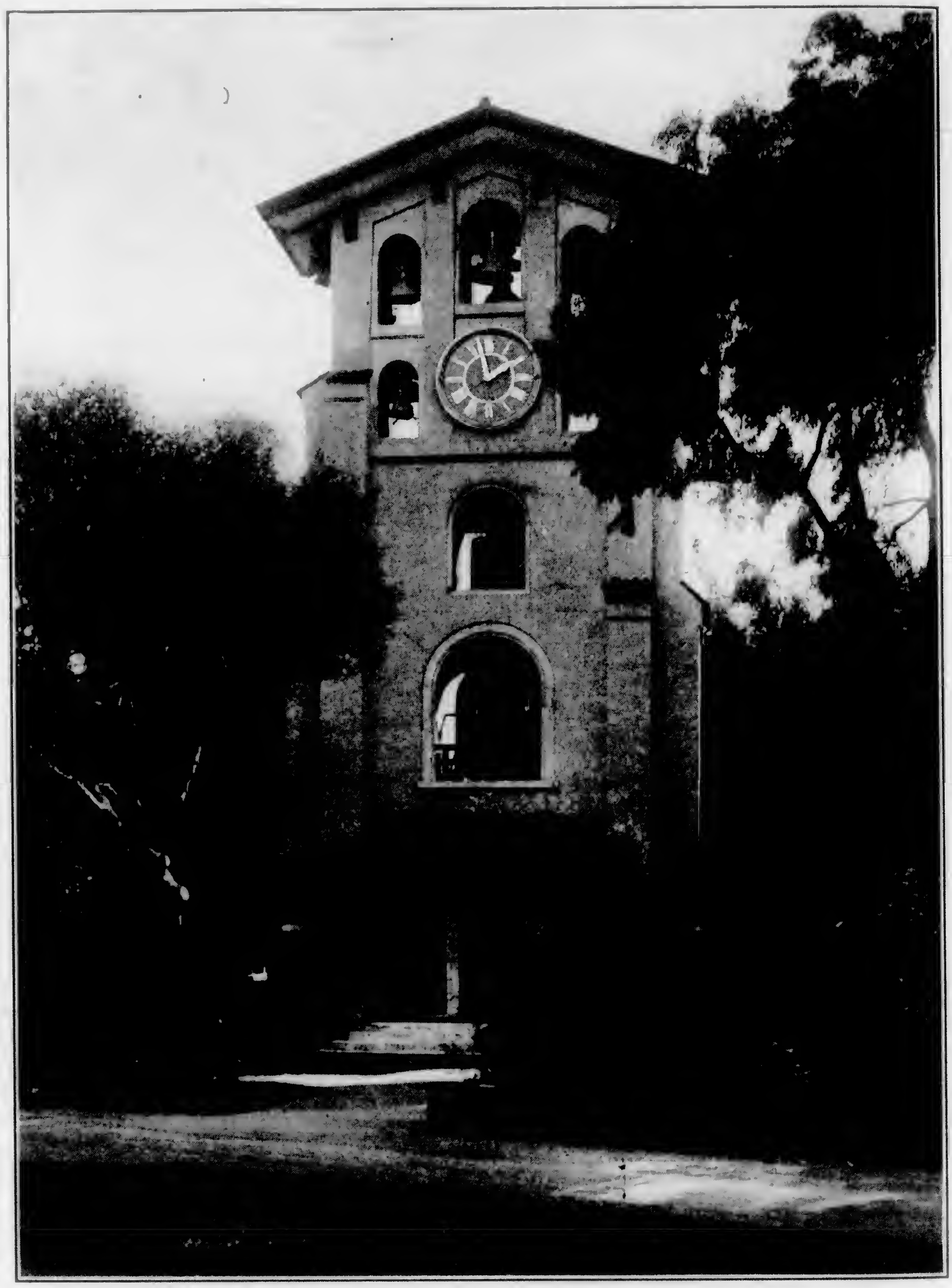
Bell Tower of Reinforced Concrete, at Mills College, Cal.
Julia Morgan, Architect



Warehouse for Prospect Investment Co., San Francisco
Bliss & Faville, Architects



Second Floor Prospect Investment Co. Building, San Francisco
Bliss & Faville, Architects



Bell Tower of Reinforced Concrete, at Mills College, Cal.
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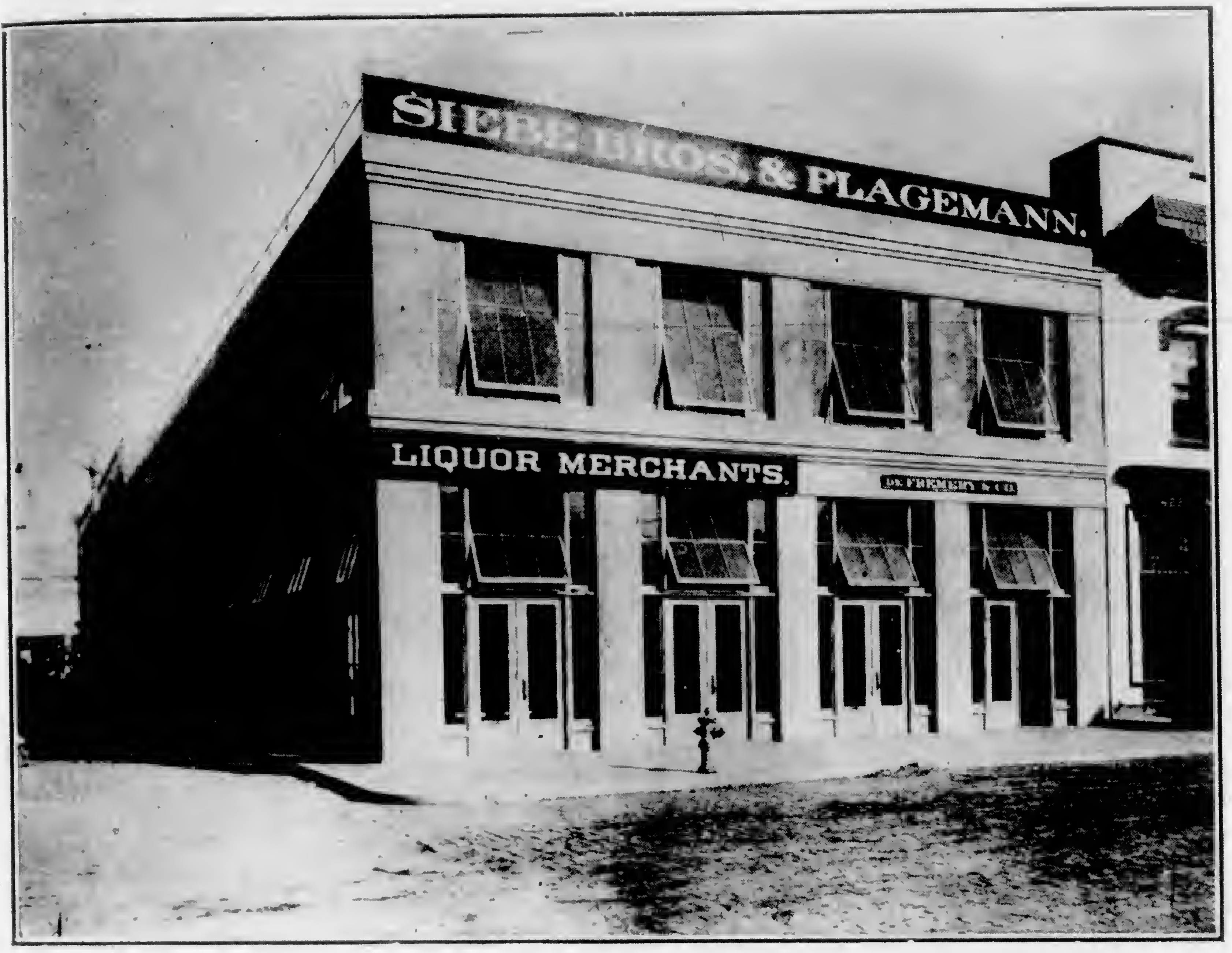
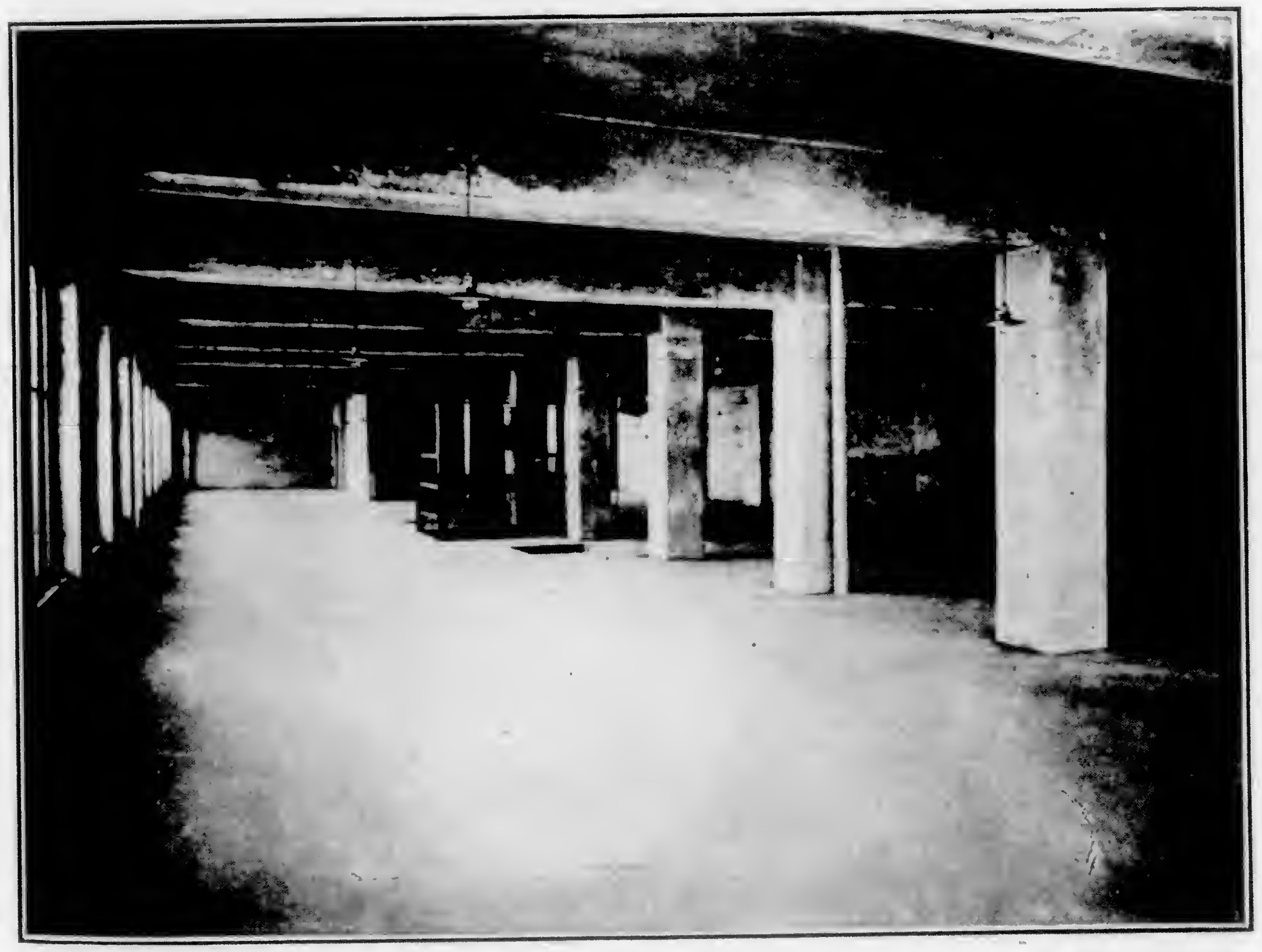
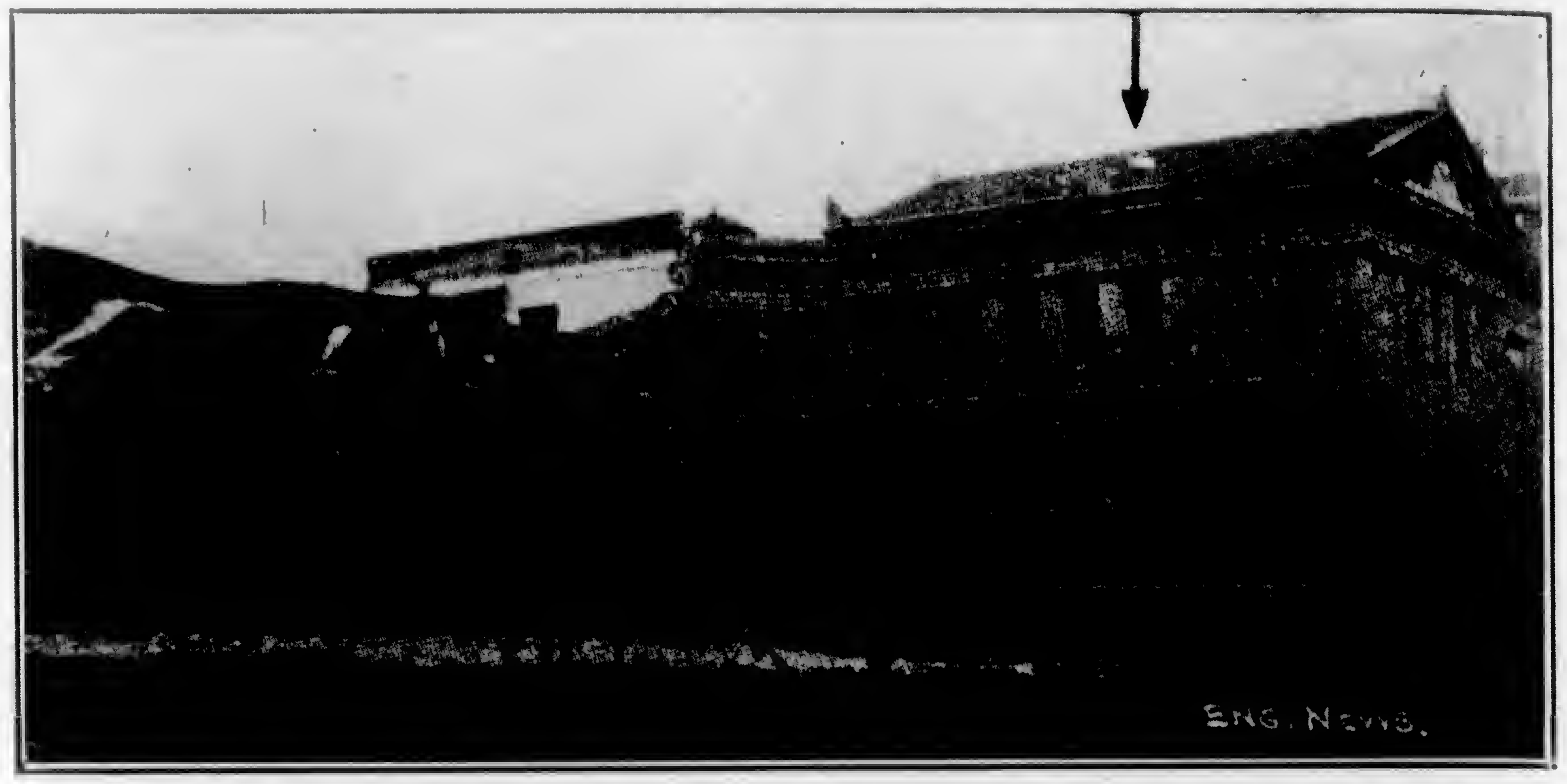

SIEBE BROS. & PLAGEMANN.
LIQUOR MERCHANTS.

Warehouse for Prospect Investment Co., San Francisco
Bliss & Faville, Architects



Second Floor Prospect Investment Co. Building, San Francisco
Bliss & Faville, Architects



Museum Building, Stanford University
Recently Built Rear Wing Brick Stuccoed *Original Building Reinforced Concrete*

with that used in other parts of the country. The excellent qualities of reinforced concrete and its ability to withstand earthquake shock were strongly demonstrated."

John Stephen Sewell, Captain Corps of Engineers, U. S. A., wrote to Mr. Ransome in 1906 as follows:

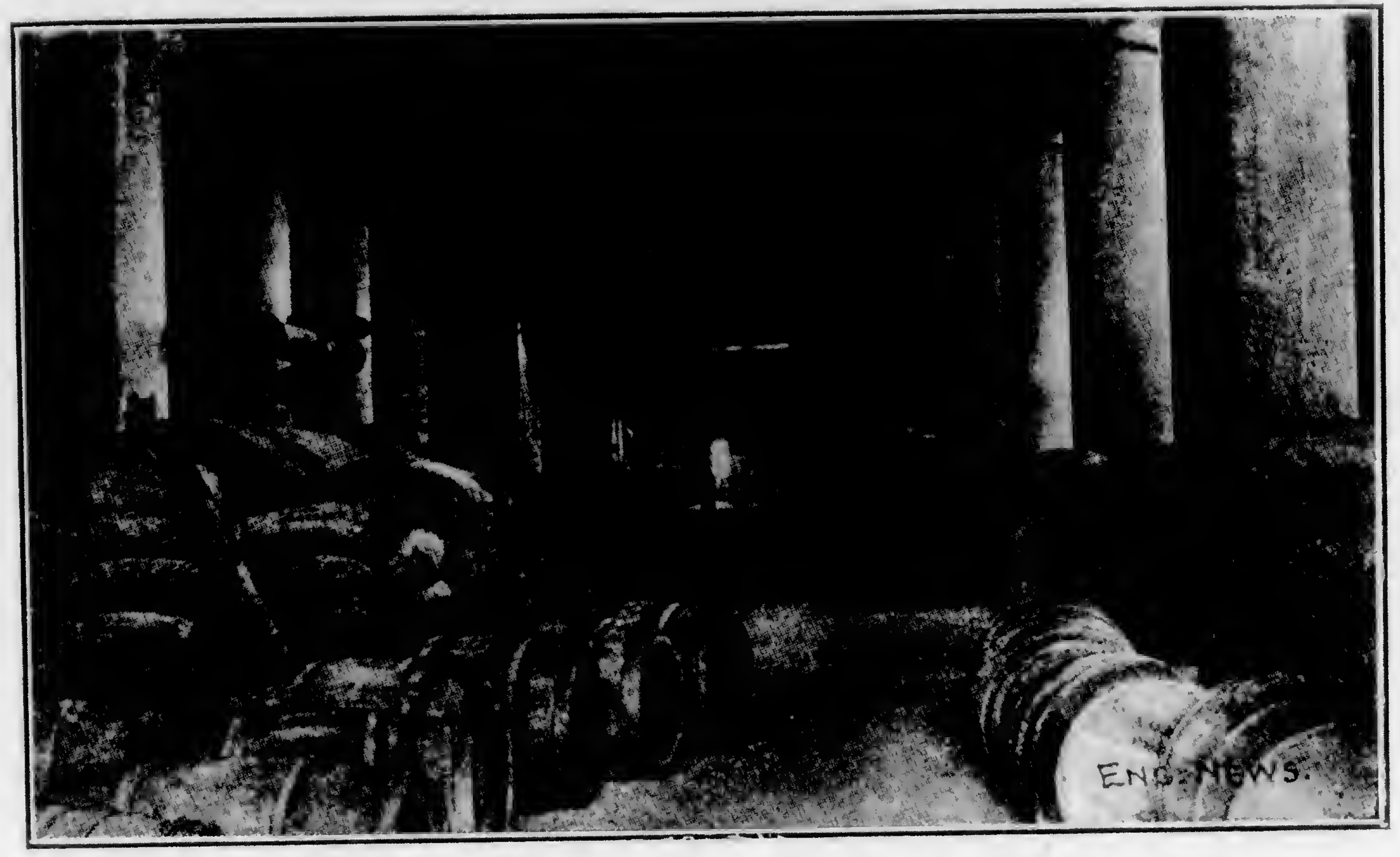
"I have been out to the Pacific Coast since the earthquake and the fire, and I want to congratulate you on the remarkably good record made by your buildings at Palo Alto.

"The behavior of your buildings on the Pacific Coast has proven quite conclusively to my mind, that, for resisting earthquake shocks there is no masonry like reinforced concrete."

Among other structures erected by Mr. Ransome in this vicinity at that period was a concrete bridge in Golden Gate Park, San Francisco. This bridge, which was not damaged by the earthquake, has the distinction of being the first reinforced concrete bridge constructed in America.

In connection with the earthquake damage in Golden Gate Park, Mr. Humphrey writes as follows in the U. S. Geological Survey Report:

"The most interesting structure in Golden Gate Park is the cyclorama on the top of Strawberry Hall, built about fifteen years ago. The top of the hill had been leveled off in order to form a foundation. The cyclorama consisted of circular walls of reinforced concrete, the aggregate of which was a hard shale crushed to concrete size. This material was very inferior and yielded a poor concrete. The reddish-brown effect was obtained by means of a veneer (1½ to 4 inches thick) of a concrete consisting of crushed brick, sand and cement. The reinforcement in the base consisted of four ⅞-inch cables of thirty strands each. The reinforcement of the columns consisted of ¾-inch twisted bars and ½-inch stirrups. The entrance, with its very heavy, massive top, should have been of hollow-construction reinforced concerte. The settling of the foundation or fill under the vibration of the earthquake caused the structure to collapse. The slip occurred principally on the northeast side, the movement being 4 or 5 feet. The principal crack in the base was about 11 inches wide, with a half-inch horizontal crack leading from it along the reinforcement. The floor is in good condition, except the pavement, which broke into blocks, most of the planes of fracture coinciding with the actual joints between the different sections. Under the circumstances—the undermining of the foundation by the slip as described—the structure developed remarkable strength. No brick or stone structure could have stood the shock so well. The rustic railing around the outside of the walk, which was of wrought-iron pipe covered with wire mesh and plastered with Portland-cement mortar, was distorted by the slip, but otherwise uninjured.



Interior View Alameda Borax Works (After Earthquake)
Built in 1888

"At the bottom of Strawberry Hill is a bridge crossing over Stow Lake. This bridge is made of concrete, and showed no signs of cracking, although the banks of the lake slipped into the water."

These earlier buildings, necessarily somewhat crude in design as compared with present methods, nevertheless demonstrated the correctness of theory and stability of structure of the Ransome system of reinforced concrete.

A structure completed only a few days before the earthquake at Mills College, east of Oakland, also demonstrates the advantages of construction under the Ransome system. The structure referred to is the Bell Tower illustrated in the accompanying view. It stands near the entrance to the grounds and with its Mission style of architecture and beautiful chime of eight bells is admired by all. Miss Julia Morgan drew the plans for the tower. It rises to a height of nearly eighty feet and is constructed with hollow walls, six inches in thickness, reinforced with Ransome twisted bars. The roof, porticoes and buttresses are covered with red Spanish Mission tile. As stated above, this tower was completed but a few days previous to the earthquake of April 18, 1906, and although many of the other buildings on the college grounds were badly damaged by the shocks, the Bell Tower came through without being damaged in the slightest degree.

Several buildings have recently been erected in San Francisco and vicinity under the Ransome system which not only embody the already mentioned principles, but also demonstrate the economy and efficiency of the Ransome design. The warehouse building of the Prospect Investment Company, Battery and Merchant streets, Bliss & Faville, architects, illustrated herewith, is a two-story and basement monolithic structure, 46 by 137 feet, with 23-foot spans, designed for a floor load of 300 pounds on the first floor and 200 pounds on the second. Provision was made in the design for the future addition of two more stories. This building was recently completed by the Ransome Concrete Company at a net saving to the owner, under the original estimated cost, of, approximately, three per cent.

In Melrose, the same contractors have recently completed for the Oakland Cotton Mills a two-story factory building of mill or slow-burning construction, which has drawn forth many favorable criticisms from manufacturers and engineers. The walls and foundations of the structure are of reinforced concrete, built in accordance with the Ransome system, with steel columns supporting the upper floor and roof, this construction giving the maximum amount of light. The excellent illumination of the entire interior is well indicated in the accompanying views of the two floors. The interior columns, floors and roof are of heavy Oregon pine timbers, the finished floors being of maple. The dimensions of the building are 300 feet by 75 feet.

Notwithstanding the fact that this factory building was constructed of the best materials and to carry heavy machinery, the cost has been kept down to a remarkably low figure. The Ransome Concrete Company took the contract at an estimated cost which was twenty-five per cent below the next highest bid (submitted by another prominent contractor) and actually completed the building at a saving under this estimated cost of ten per cent. In other words, the completed cost represents a saving of thirty-three per cent under the next highest bid. The unit cost of the building is remarkably low, being less than four and one-half cents per cubic foot, a figure which is exceptionally low, when it is considered that five cents per cubic foot is regarded as a very low cost in the East where labor and material are both cheaper.

At the present time, when so much is heard in San Francisco of owners being required to pay from fifty to even one hundred and fifty per cent more for their buildings than called for in the estimates, it is refreshing to learn of one firm which is completing buildings at a substantial saving under their estimated cost.

* * *

Unique Building for Chinatown, San Francisco

THE Yee Fung Toy Association building on Waverly place, between Washington and Clay streets, San Francisco, illustrated in this number, was designed by Hamilton Murdock, architect, and erected by the Delmar Smith Company, engineers and contractors. It is one of the latest examples of modern buildings with a distinct style of Chinese architecture.

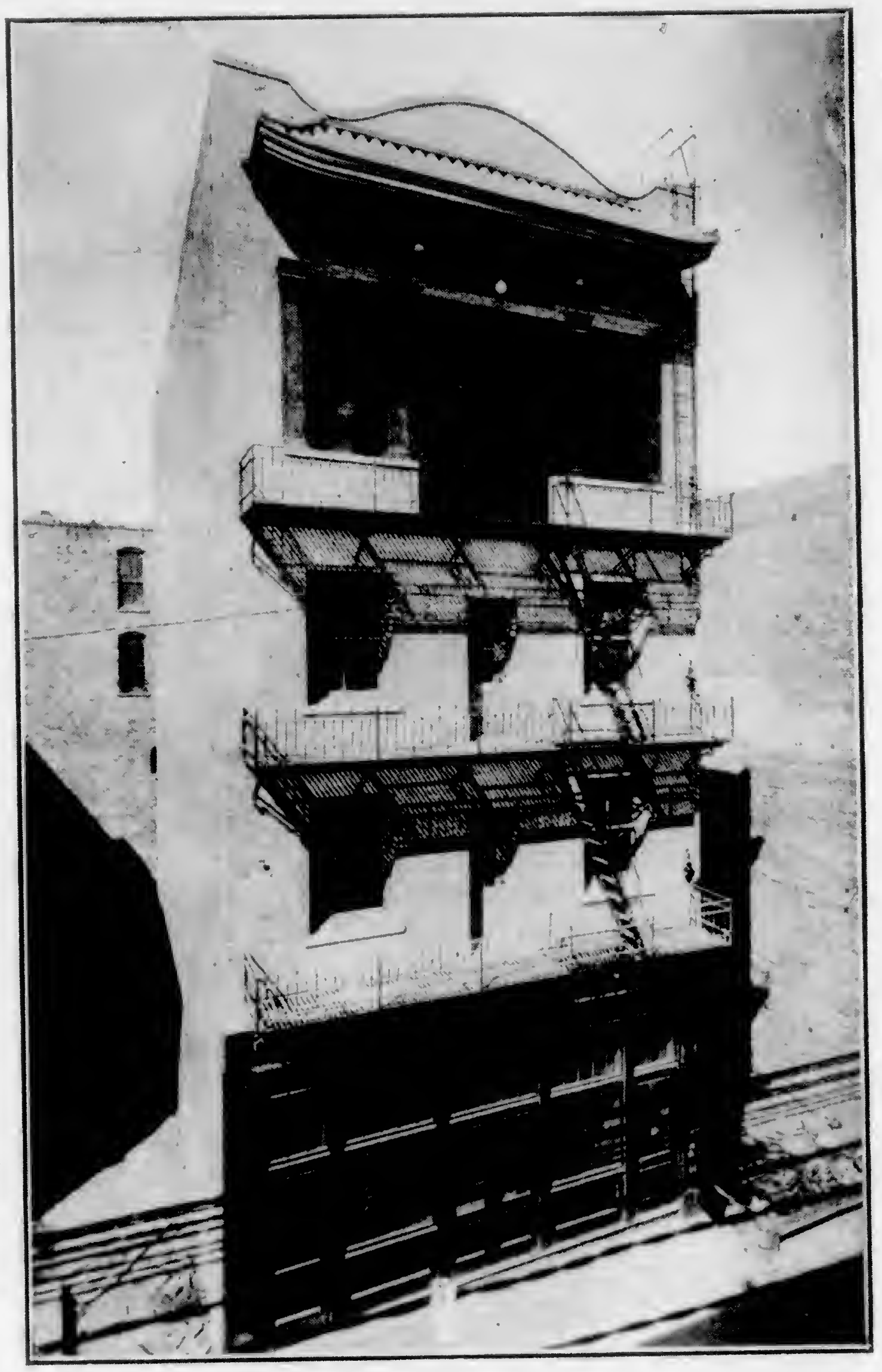
From an engineering standpoint the building is constructed with special regard to strength, which meets the Chinese idea of permanency, cast iron columns, heavy joists and girders being employed.

The store front is of cast iron, with plate-glass windows, the extreme height of the windows from the sidewalk being a notion of the Chinese merchants.

All touches of Orientalism are omitted except on the top floor, where certain curves, typical of Chinese architecture, give a crowning feature to the building, express the interior, and lend a dignity desired.

Each floor is complete with plumbing, cement kitchens, and provisions for brick ranges. All stairs are protected with iron treads.

The basement and first floor are purely commercial, the second is to be furnished as a reception room, the third contains a number of comfortable rooms for members of the association and the stairs to the fourth floor land on a balcony which has a tile floor, brick balustrade with granite copings, heavy columns, etc.



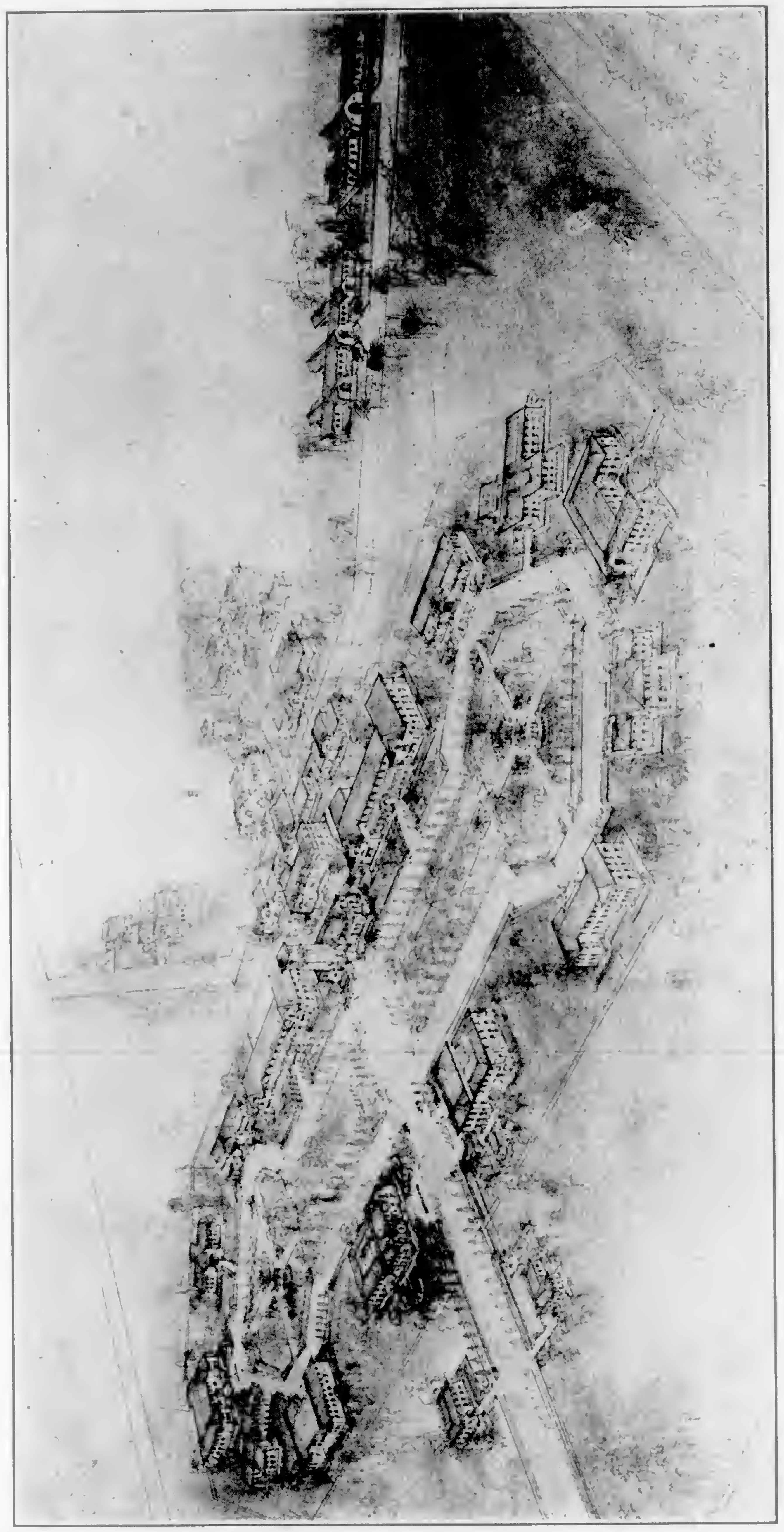
Yee Fung Toy Building
Chinatown, San Francisco

Solid walnut doors, with iron thresholds, lead into the large assembly room, which has an oak floor; decorative skylight screen, and is resplendent with imported carvings, screens, hangings, draperies, altar stand, furniture, vases, etc. Off this room is a committee room of equal splendor.

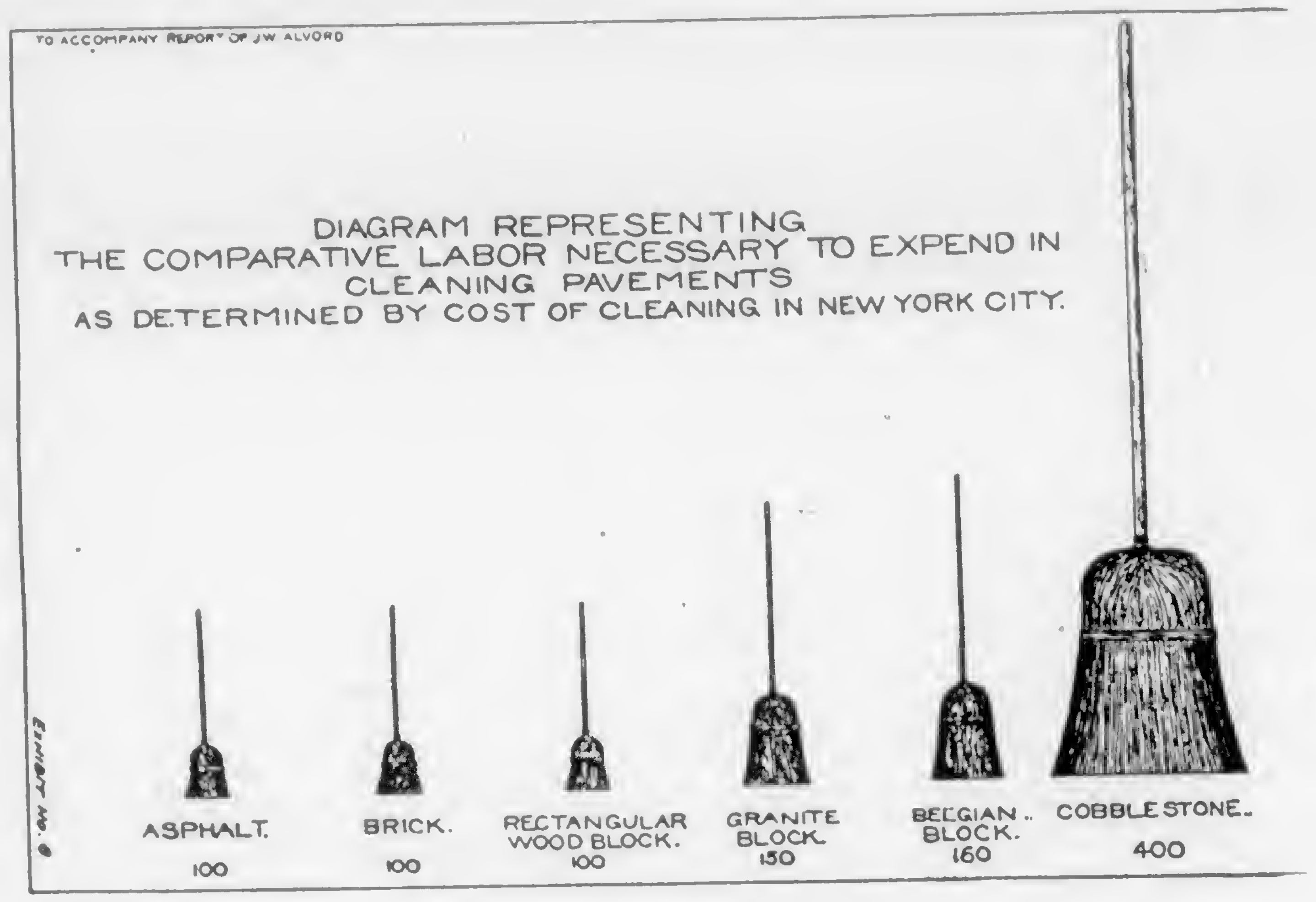
The yellow pressed brick of the exterior, combined with the black iron balconies, and architrave of the first floor, the heavy columned balcony of the fourth floor, typical cornice, red terra-cotta inscription, which color is repeated in the architrave panel on the first floor, all tend toward a pleasing structure.

* * *

"What shall I read you first?" "The marriages." "Here's an article about some boys who were found playing with dynamite." "Well, read it. It possesses the same elements of interest."—Houston Post.



Proposed New Agnew State Hospital. From a Sketch by George C. Sellon, State Architect.



Brick Pavements

PAVING is an industry the extent of which is seldom recognized, although the taxpayer has his attention called to it oftener than to any other source of municipal expense aside from the ordinary municipal housekeeping. It is said that there is but one class of engineering operations in the United States, the building of railroads, which exceeds it in extent. During the nineteenth century nearly one billion dollars were invested in paving and each year some seventy million dollars are added to the cost of pavements in the way of additions and maintenance.

Great as is the expenditure it is made in unsystematic manner, few cities, even large cities, studying the subject with the thoroughness which its magnitude demands, and few making their decisions regarding materials and methods of construction upon scientific principles. Most of the cities and towns attempt to follow the example of those which have had a little experience and are presumably better informed, but on account of lack of ability to choose good models and lack of knowledge of how to follow and when to depart from these models, their results are imperfect and lacking in beauty and durability.

Brick is one of the oldest paving materials, having been used in Holland for a century or more in such cities as Amsterdam, some of whose streets are shown in the first two of the accompanying photographs. It seems to be able to stand misuse in construction, especially in the less heavily tarveled streets of the smaller cities, better than any other paving material, and as a consequence is one of the most popular materials for this class of cities. In larger cities where pavements are more scientifically laid, brick is also popular, because in them it is better laid, has smoother surface, but is less slippery that most other hard pavements.

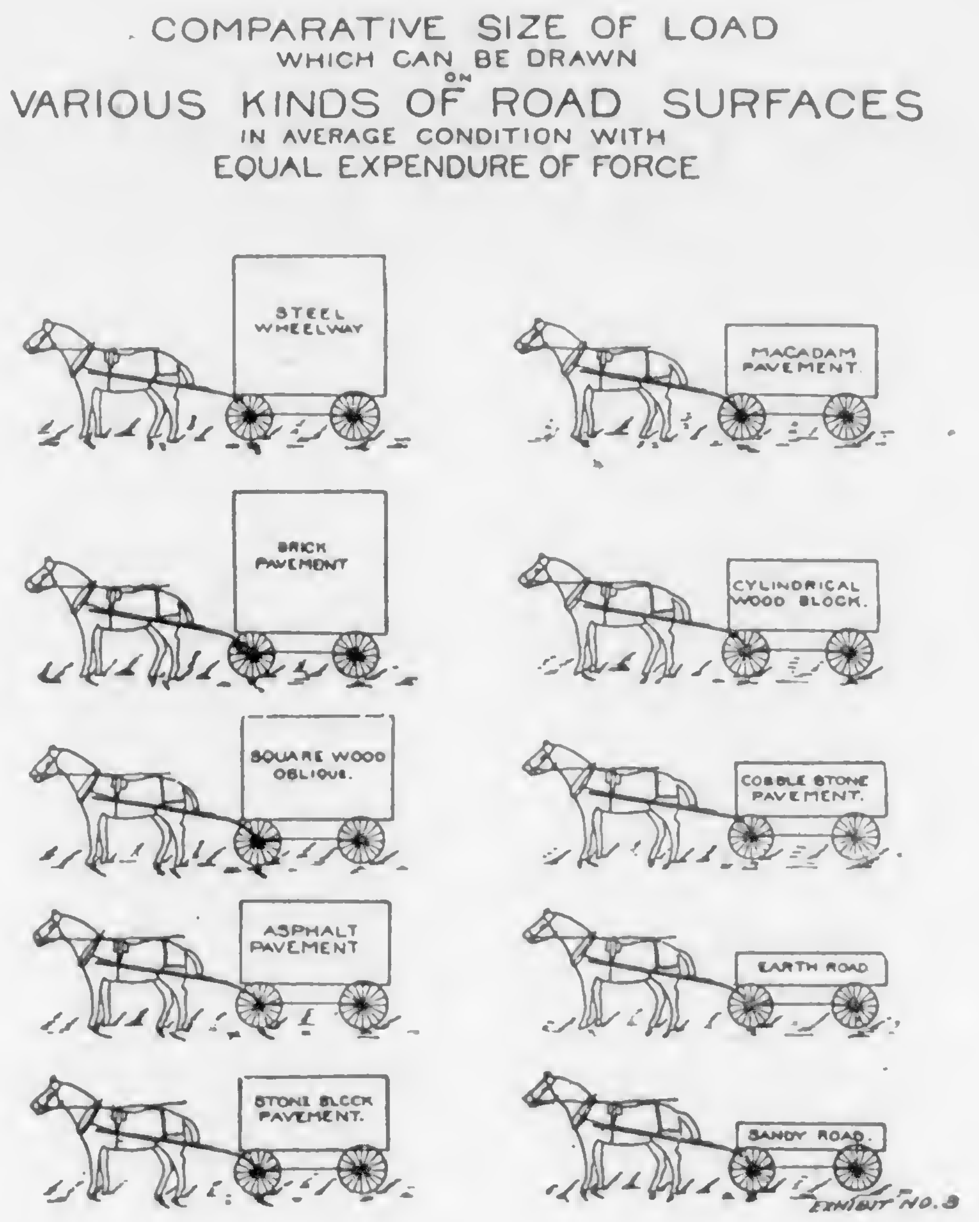
It makes it way with little noise, because the general distribution of the materials of which bricks are made and the comparatively local nature of the brick-making industry makes combinations or consolidations practically impossible, and there are few to indulge in noisy promotion though many to supply the necessary material. It would be better for the paving brick industry and doubtless for the cities if there were unity in the paving

An Ideal Brick Pavement in a Business Street

brick trade, at least in the advertisement of the benefits of using brick as paving material. The same energy put into the promotion of brick as a paving material which is put into that of materials which are in the control of a single corporation or small group of corporations would popularize the use of brick as rapidly as that of some of the ther materials has been spread.

Charleston, W. Va., Bloomington, Ill., and similar small cities began the use of brick, of comparatively poor quality, in 1870 and immediately succeeding years, and some of the pavements lasted 20 and even 30 years without replacing. The example of these cities was followed even against the active work for other pavements and in the ten years from 1890 to 1900 33 per cent of the hard pavements laid were of brick; asphalt, with 43 per cent, being the only material of greater popularity. Granite pavements made 10 per cent, wood 9 per cent and miscellaneous pavements 5 per cent of the total.

The latest statistical report of paving in cities is that for 1903 for cities of more than 25,000 population, published by the U. S. Census Bureau. Most of the cities of less than 25,000 use brick pavements largely to the exclusion of other paving materials, so that this report will not give brick its proper place as a paving material in all the cities of the country. It shows, however, that these larger cities of the country had at that time 31 per cent of their hard pavements of asphalt, 25 per cent of granite, 19 per cent of brick, 14 per cent of wood and 11 per cent of cobblestone. When we consider that a considerable percentage of the granite and practically all of the cobblestone was laid before 1890, it will be seen that brick holds a very important place among the modern paving materials of the larger cities and very nearly keeps the ratio of the construction between 1890 and 1900, notwithstanding the omission of the statistics of the smaller cities from the figures for 1903.



Two of the reasons for the preference for brick pavements are shown graphically in Figs. I and II, taken from a report on street paving made by J. W. Alvord to an organization of Chicago citizens. One of these shows the relative loads drawn with the same expenditure of force on various forms of roads or trackway, in which brick takes a place at the head of all paving materials. The other shows the relative labor necessary to clean the various pavements, in which brick takes the lowest place, being equally, but not exceeded in economy of cleaning by asphalt and rectangular wooden blocks.

Fig. III shows the main business street of Dayton, O., paved with brick. Dayton laid its first pavement of Mack brick in 1891 and in 1903 had 13.9 miles of brick streets or 355,510 square yards out of a total of 33.3 miles of improved hard pavements.

The quality of brick must be carefully considered and tested. Not all clays and shales make good paving brick, and not all factories make uniformly good brick. Careful analysis and tests must therefore be made of new kinds of brick offered and there must be thorough inspection of all brick before laying and again before final completion of the pavement.

Perfection of machinery and kilns and good workmanship are essential to good product.

Our Interest In and Duties Toward Architecture *

By LOUIS CHRISTIAN MULLGARDT, F. A. I. A.

I HAVE chosen as title for my lecture "Our interest in and duties toward architecture." Let us first consider what our interest in architecture is really founded on, and in that way we will perhaps discover what our duties toward this great Art are.

In the first place, we must look upon architecture from the standpoint of comparison to other things in our lives and as to the position which it occupies relative to the other fine arts. We will try and discover as much as we can about the relation which it bears to the other arts and in what sense it differs. Also, as to whether the other fine Arts, namely, music, painting, sculpture and etching could flourish as well provided there was no architecture. We may find out to what degree it affects our lives and what our condition would probably be if we were totally oblivious to any sense, knowledge or appreciation of architecture, as if it did not exist.

Let us recall the facts established in history that architecture, like music, is a product of the mind. There is something which comes out of the sense or soul of mankind which is not copied from nature like a landscape or a portrait, although it derives its inspiration from nature like music does from the song of the bird and the ripple of the brook.

Primitive architecture was very crude and simple. It was the best that the sense of man could produce at the time when it sprang into existence, because man's sense was also crude and simple in the beginning and his conception was small. This, we must remember, was many thousand years ago. In those days man's abode consisted of a cave in the rocky formation of a hillside, the entrance of which was built of logs, otherwise, huge stones hewn into shape by nature's hand and was made exceedingly small as a protection against an enemy or wild beasts' entry; so small in fact, that the entire portal would doubtless have had to be removed each time should the delivery of pianos have been as common as it is today. Those were the days when women knew not the intense excitement now produced by a full page advertisement of a Monday's bargain sale as published in the Sunday's paper. Those ancestors of ours had not even reached the "sit-by-the-fire-and-spin" days. Those were the days of slung shots, clubs and other crude weapons for attack and defense; the days when the prevailing style of wearing the hair was to let it hang straight down the back and using the pelt of some other animal as a part covering of the otherwise naked body.

Think of the ages which have slipped by without record of any sort before primitive man became sufficiently enlightened to give evidence of increased sense of development as regards form and proportion. It was then that the log became a hewn post or beam, and the rough stone became a pier, column, lintel or arch-stone. It is impossible for us to conceive how many thousands of centuries it must have taken for this gradual development, which development we find was progressing in a similar way in various remote parts of the earth at the same time. New traces of prehistoric people are repeatedly being discovered who inhabited our planet and who builded as best they knew how. They were our predecessors; each tribe or nation in turn seems to have reached a certain stage of perfection when the psychological period of its existence was cut short through some stronger foe which came to conquer, pillage and destroy.

This system, if we may call it such, of gradual development and ultimate destruction and supplanting is so common in history that it seems to have been a matter of destiny for a tribe or nation to reach its highest state of perfection and then in turn, like its predecessors, be doomed to fall so as to make way for its, perhaps stronger successor to carry on the work to a higher state of development.

You will recall that Jerusalem, Egypt, Athens, Troy, Corinth, Rome each experienced in turn its gradual rise and ascension to great power, and when their state of highest effulgence had been reached, then came the inevitable conquering foe to disrupt and destroy, in part or in whole, all that had been done during the marked epochs of their existence. To be sure these cities and nations were of a much later date than the period of primitive man first referred to, and I offer them only as instances of the same general system of growth and destruction which preceded.

In the history of nations architecture has always, and probably will forever, tangibly mark the spirit of highest ambition to which any nation is destined to climb. It is the only concrete means of expression whereby a nation incidentally makes manifest its growth and progress, social and political.

The history of a nation is as inseparable from its architecture as our individual lives are from the homes in which we dwell. A nation's architecture never becomes better than the nation is itself, since architecture is in every instance a direct expression of the life, manner and ambition of its people who give it definite expression, conforming to the ways and manners of their method of living and thinking.

The Greeks built many beautiful temples in which they worshiped their many Gods. They also built their amphitheatres in which theatrical performances were presented, and their stadiums in which they held their athletic contests. The Egyptians built their temples also, but altogether different from those built by the Grecians. They erected great pyramids and obelisks to commemorate their kings and warriors. The Romans constructed great forums in which to conduct their business of state and commerce. They were also an heroic pleasure-loving people, therefore, they built amphitheatres similar to the Athenians and Coliseums for their great contests which meant life and honor, or death to the participants in their games. The Jews of Palestine were great traders, hence their great marts. They were also great worshipers and therefore built synagogues of worship. Thus we may go on, relating to the minutest detail the prevailing characteristics of a nation and trace them back by means of the remnants represented by the architectural ruins discovered by our historians and archeologists.

This rule, or natural law, we may call it, whereby architecture characterizes a nation has been forever present even to this day, and I believe that it is forever destined to be a people's chief characteristic. The characteristics of a people manifest themselves in various parts of the country, even to the smallest hamlet and to the most obscure individual. In our own wonderful country, wherein we have made such marvelous progress during the past century (which is a very short time for any nation to make such marked progress in all things as we have) we find that each town and city has its distinct architectural characteristics as the result of the habits and customs of the people. We have, for instance, our city of churches, our cities of manufacturing industries of various kinds, our cities of beautiful homes, our cities of commerce and trade, our cities of grain elevators, and our cities of beef and pork packing industries, and our cities of breweries.

The architecture of our land is, through a matter of circumstances, of the most diversified sort, because we are a nation constituted out of many nations of the earth, and we are as yet too young, as a nation of peoples, to have become sufficiently amalgamated into a single entity, as yet to claim, or otherwise be

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* Extracts from a paper read before the Cap and Bells Club.

accused of having developed a distinct national style of architecture of our own. In view of the great length and breadth of our land it is a mooted question as to whether we will ever have a style of architecture which may be termed distinctly national. Our ambitions and customs in various parts of our country are sufficiently diverse, likewise our climate, to prevent anything which might possibly savor of uniformity.

Up to this time, we have appropriated something from nearly every known style of European architecture throughout the length and breadth of our land. We have transformed these styles sometimes for better or for worse, but they still remain the re-echoings of the architecture of other countries, which we might call European styles Americanized with new cadences, variations, and frequent discords resembling in a measure the occasional construction of an Elizabethan front and a Lizzie back.

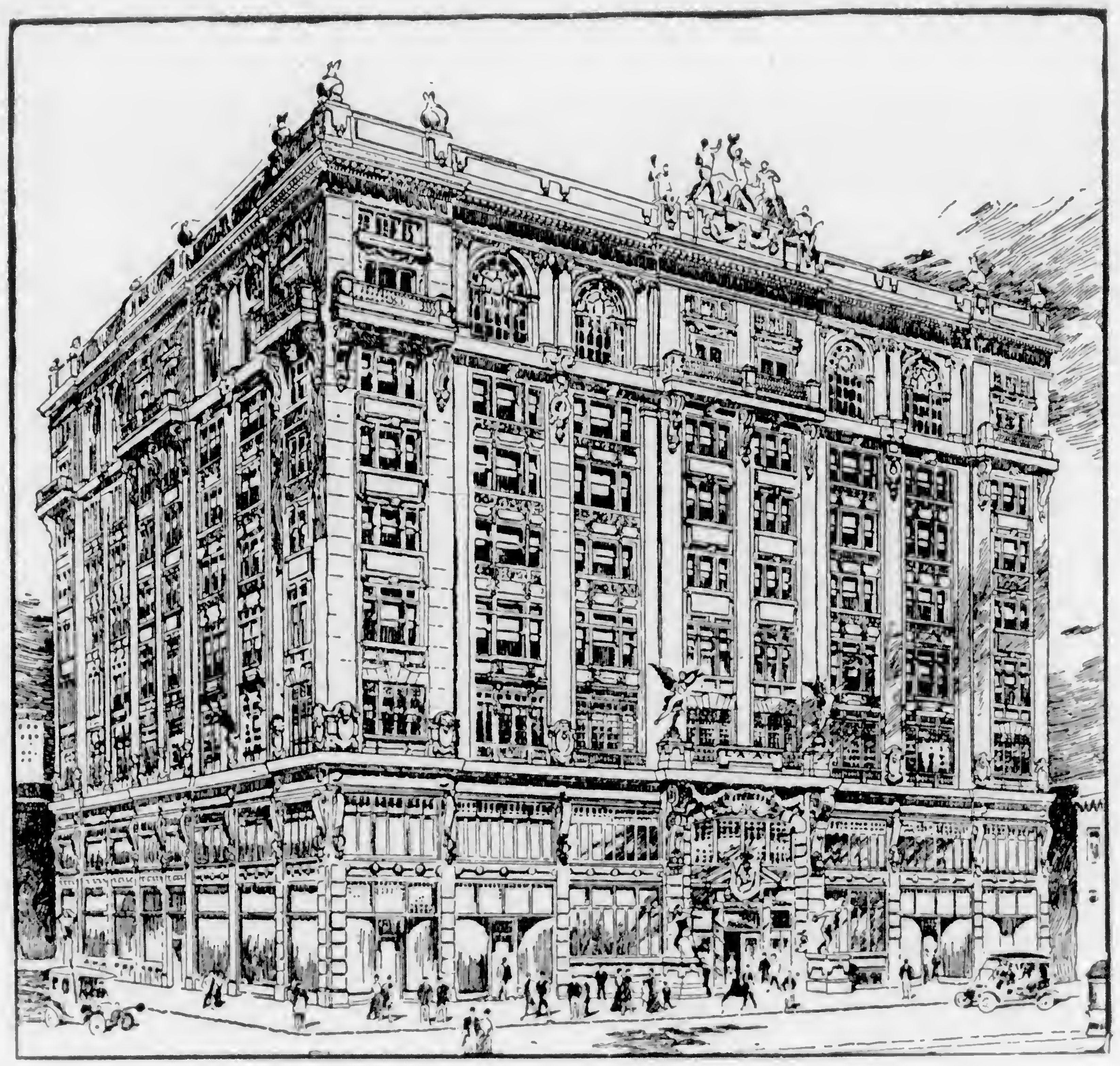
A great musician once upon a time presented a most sorrowful expression as the result of his deep anguish because of the great amount of trashy music which was being annually produced and placed upon the market for the great multitude to feast upon. This great musician understood the truly inspiring influence of a worthy musical composition and he argued that only good music was elevating in its influence, whereas, bad music was positively detrimental in its effect upon mankind, and for that reason he advocated the establishment of something similar to a censorship, through which all musical compositions had to pass before the same were given out to the public. His contention was that so long as anybody might inflict the public with their production without law of restraint the influence for bad would continue to linger with music and tend seriously to retard its progress as a fine Art.

You will, I am sure, agree with this musician's theory on the subject of music, and its respective influence either for good or for bad according to its true merit. This same theory you can see applies equally well to the other fine Arts. The good things in music are necessarily the best product derived from the master minds in the musical realm, whereas most anybody can compose so-called trashy music.

Architecture stands in practically the same relation as regards its influence upon the public as does music. Architecture, at the same time, is an Art peculiar to itself, in which nearly everybody dabbles sooner or later. Music manifests itself to the sense of hearing. It does so intermittently and has its pauses. A poor musical production can sometimes be ignored or assigned to oblivion somehow, and with comparative ease, whereas, architecture to the contrary, and ofttimes, sad to relate, can not. It becomes a rendition in stone, brick or timber which is destined to outlive its influence without intermission without pause, since it is ever present when once brought to the sense of sight. To assign it to oblivion would mean a much greater financial sacrifice than we are prepared to submit to since it means the deliberate destruction of private property for Art's sake, which in our days very seldom happens.

Nearly every carpenter or brick mason can draw sufficiently well to prepare some sort of a design for some sort of a building; the knowledge and ability to draw is, of course, indispensable to the designer of buildings. It is the most direct medium of expressing on paper that which is to be executed in brick, stone or timber, but the ability to draw does not in itself constitute a knowledge of design any more than the ability to write musical notes on paper would in itself constitute the knowledge required for a great musical composition.

The knowledge of drawing, and the knowledge of writing notes, therefore, serve merely as the most direct means of conveying individual thought into information to others regarding that which is to be accomplished in the



New Home of the Los Angeles Athletic Club
Harrison Albright, Architect

nature of a result. They are the records of the inspired thoughts of the architect in one instance and of the master of music in the other; hence, it naturally follows that the drawings as well as the notes are worse than useless unless they are expressive of truly worthy compositions.

Truly worthy compositions, either in architecture or music, do not emanate from the minds of others than those who are masters of their Art; therefore, it would be as unreasonable to expect a carpenter or anyone else equally unqualified to produce a worthy architectural composition as it would be to expect an ordinary music hall pianiste to write a worthy composition in music. To further illustrate this point, I beg leave to quote the following lines, which are in a measure apropos:

"That the bird who could sing and would not sing a bit
Was churlish there is no denying,
But not near so bad, you will surely admit,
As the bird who could not and kept trying."

Each and every one of us is through natural laws and influences, assigned to some worthy task for which we are best fitted in this life, and, if we are seriously disposed to produce a creditable result during our life-time, then it is most essential that, each one of us, stick most religiously to our field of work—not that alone, but we must also encourage others to do likewise in respect to their special line of work, which, when once discovered, as will be the case sooner or later, then dissuade and discourage any further effort to operate in fields other than such to which the individual is best fitted by nature, which means inheritance and training, of course—thereby alone can we hope to accomplish the best results for our individual selves and for the benefit of the greatest number.

Somebody once said that "Architecture was frozen music." The thought occurred to me at the time of our great fire, during April, 1906, that if the author of that particular remark could only have lived to be in San Francisco at that time, he would have witnessed one of the greatest architectural thaws that the world has ever experienced. A great deal of the "frozen music" which was destroyed in that fire was justly deserving of its fate. We are naturally sorry to have to admit this fact, but we can rest assured that however much we may deplore the terrible loss which was encountered during that fire, in a few years time we will have a much more worthy city than we had before, and our progress will have been much greater in every respect than if that fire had never destroyed our architecture.

Architecture is the supreme Art of all Arts—it is a light unto itself which is as inextinguishable as the light of the sun, or the stars which shine at night. Architecture can not be debased because it has the life giving quality which is wholly unconquerable and wholly pure. A misuse of its power of purity and virtue is no reflection upon the Art itself but reflects solely upon those whose ignorance causes them to misuse and abuse its qualities of truth.

Truth is its first essence, for it must be known that no product in the name of architecture can consistently be termed wholly good unless it is a direct expression of truth.

Architecture is the direct expression of the relative social and political conditions of a nation or a community, and the Arts of painting, sculpture, etching and music are woven into its wonderful fabric like a piece of embroidery each to become more beautiful with the advancement and greater degree of perfection of the other, and also as architecture is better understood and produced with greater consistency to meet and keep step with the most advanced requirements in the life of a nation.

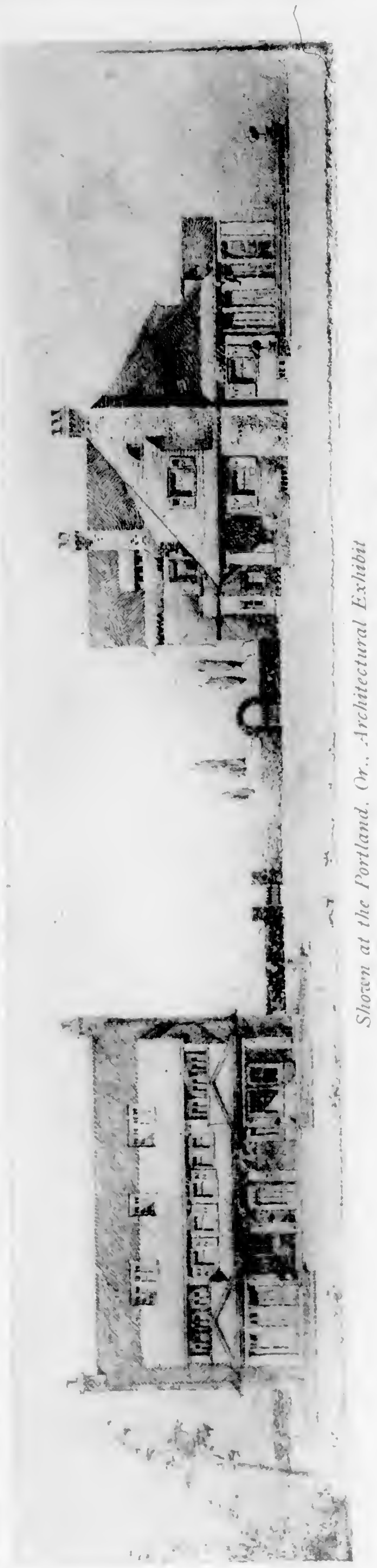
Finally, when mankind has met its destiny to produce a quality of architecture entirely free from any barbaric tendency, then our lives will be equally superior and the peoples of the world will then realize that life on earth was destined to reach that state of perfection when one nation will no longer be in constant fear of and strife with the other nations of the earth.

Architecture is destined to be the barometer of our social standard as is indicated by the history of nations and the character of our work will only approach a constantly high degree of perfection as the intellectual standard of nations advances.

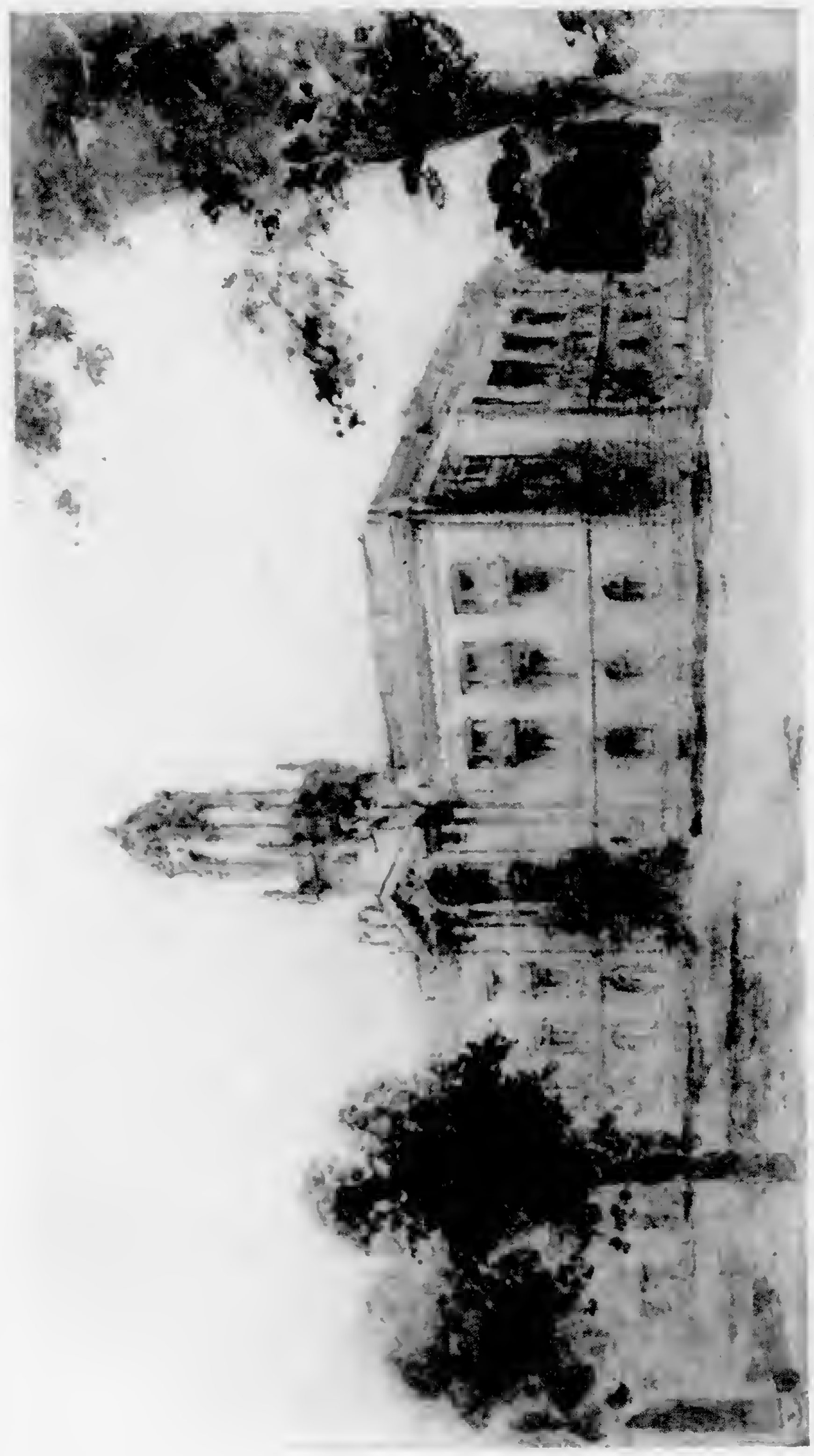
* * *

Concrete Blocks

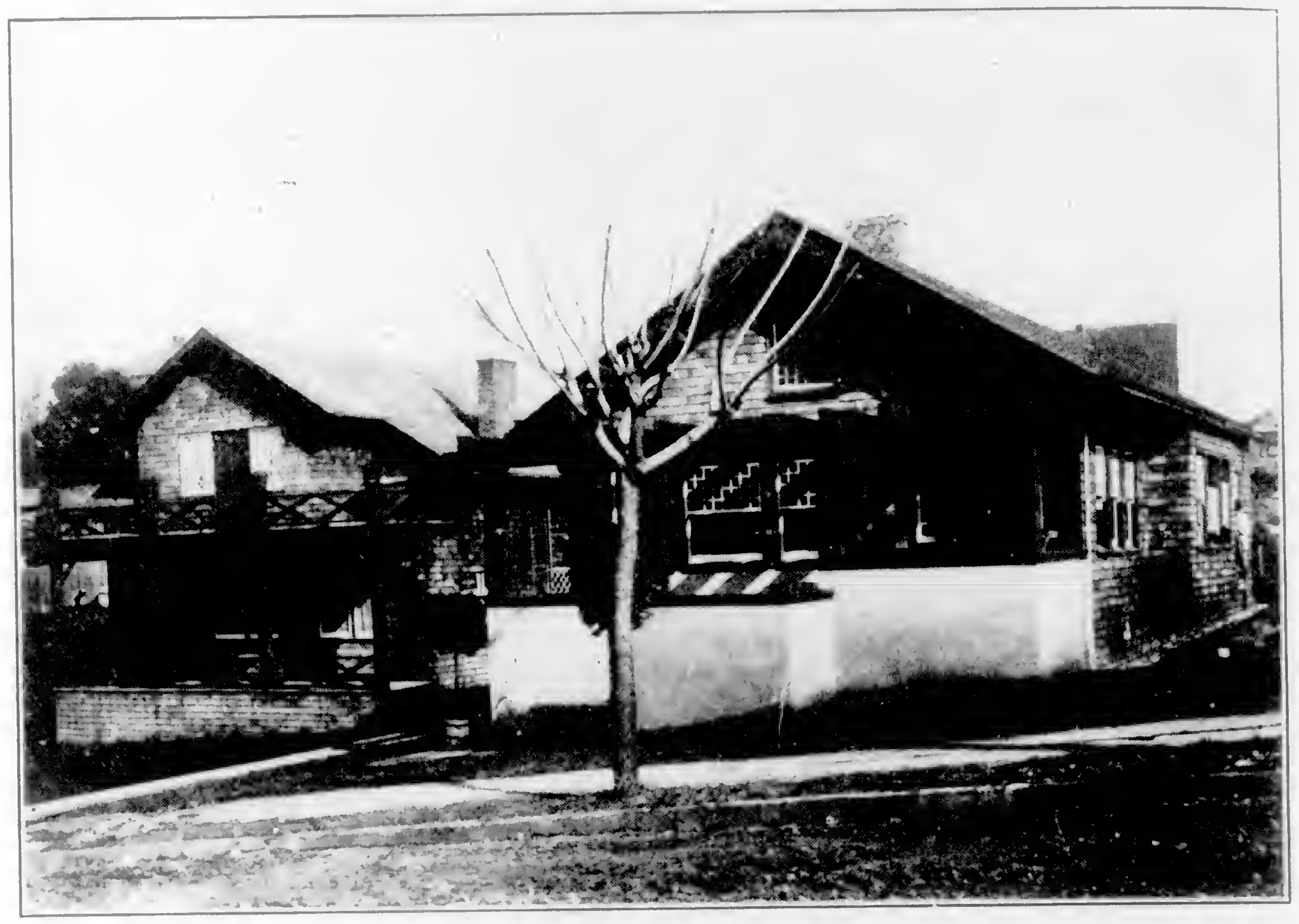
The first great obstacle to the concrete block industry has almost entirely disappeared. It consisted of the large number of incompetents who rushed into the business upon the seductive representations of charlatan salesmen, whose sole purpose it was to unload machinery, and to collect, regardless of the purchaser's possibilities for success. As a consequence of this, at the start a large majority of those who essayed to make this kind of building material had no previous knowledge of such things, and many of them were incompetents of known record, who were misled into believing that this pronounced advance in building materials was a "get-rich-quick-scheme," which waited upon the first man in each community to commence operations.—Rock Products.



Shown at the Portland, Or., Architectural Exhibit



Unsuccessful Competitive Perspective for Cumberland County Court House, Portland, Maine
Macnaughton, Raymond & Lawrence, Portland, Or., Architects



A Row of Karl Nickel Bungalows

J G McMillen
Engineer

Bridge Across the Llagas Creek, Santa Clara County, Cal.
J. G. McMillen, County Surveyor, Engineer
This Bridge is Built of Concrete, Stone Face, Span 50 Feet and Cost $700

Waterproof Engineering*

By EDWARD W. DEKNIGHT, President Hydrex Felt and Engineering Co.

IT IS one thing to build a structure and another thing to make it sound and safe. "Waterproof Engineering" means the sanitariness or healthfulness, the soundness, the safety, the preservation and the durability of structures. It means the fighting of moisture.

Waterproof engineering is based on three fundamental principles:

First. Design.

Second. Method and materials.

Third. Application.

The general subject is too broad to be covered in one evening's discussion. This paper will, therefore, treat only of the second and third principles, viz: "Method and Materials" and "Application."

All efforts in the waterproofing of structural work are divided into two main, totally divergent lines, i. e.,

First. Treating concrete to make it, in itself, impermeable.

Second. Protecting concrete or masonry with something apart therefrom, to waterproof it.

In other words, Shall water reach the concrete or shall it not reach the concrete? The real point at issue, therefore, is one of method, which must be first settled before we can intelligently discuss the question of materials. First, therefore, determine the method, and the production of the proper materials will settle itself. We will consider the two above-described systems separately.

Treating Concrete

Treating concrete to make it in itself impermeable rests upon two methods:

First. Mixing certain chemicals with the concrete to make the concrete, in itself, impermeable.

Second. Applying a cement plaster or wash on the concrete to harden its surface.

The ingredients generally used are lime, silicate, soda, lye, soap, alum, etc.

One of the present chief difficulties in concrete work is to obtain concrete properly mixed in the field. This difficulty, instead of being lessened, will be greatly augmented by the mixing of chemicals, with the cement, with the idea of making the concrete watertight. Certainly, to obtain a concrete so perfect as to be perfectly watertight will be a much more difficult thing than to obtain ordinary sound concrete. In either case there will always exist zones weak in quality and density. There is also the added danger of the uncertain effect the addition of the chemicals will, in time, have upon the tenacity and the durability of the concrete itself, and especially upon the imbedded steel. This is all experimental, and not tried and tested, waterproofing.

The objections to the second method, i. e., applying a cement plaster or wash to the surface of the concrete, are too numerous to mention here. It is poor judgment to depend upon but one layer of any single thing, which in this case is an inelastic cement plaster or a thin, almost imperceptible, wash, as the sole waterproof protection of any structure. This, aside from any consideration of the splitting or cracking of the cement

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* Read before the Boston Society of Civil Engineers, October 16, 1907.

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* Read before the Boston Society of Civil Engineers, October 16, 1907.

There is a fine distinction between testing concrete for strength and testing it for watertightness. The difficulty is that these two principles are confounded by experimenters in attempting to make concrete in itself watertight.

Assume for the moment that concrete *per se* may be made impermeable. If this impermeability will not prevent cracking, and as cracking will destroy the value of impermeability, why attempt to make concrete impermeable? Granted that even limited impermeability, as it were, is a desirable quality, is there not needed, however, something additional for dependable and perfect waterproofness for general conditions and practical work? There is no more important problem before the engineering and architectural professions than this one—Whether concrete can, in itself, be made watertight.

Waterproofness is not what it is today, but years hence. Because a briquette, or cube, or box of specially-treated concrete remains watertight in or out of a laboratory for one or twelve months is no warranty that concrete can be made permanently watertight for practical purposes. Assuming even that there can be had concrete in monolithic form so perfect in texture and mixture as the specially-prepared laboratory sample, masses of concrete in the open are subject to conditions, especially in this latitude, impossible of ascertainment and test in a laboratory sample; to extremes of heat and cold, to settlement, to contraction and expansion, to earth tremors, both natural and artificial—resulting in fractures, the opening of pores, etc., a process which certainly does not decrease with the advance of years. Water will come through concrete in time. It will take longer to work through so-called watertight concrete, but it will eventually come through it. Otherwise it would be contrary to the law of physics and nature. The same principle applies, in greater course, to cement plaster and hardening compounds for the surface.

We have seen water drawn up, through capillarity, 15 or 20 feet by concrete. We have also seen water percolate through concrete over 20 feet thick. It may take two or three years to do so; meanwhile, the assumption is that the concrete is fairly watertight. When the concrete thus becomes damp, wet, and saturated, it is almost impossible to eradicate the moisture. If the moisture freezes, expanding one-tenth its volume in so doing, it requires no stretch of imagination to calculate the effect upon the concrete or masonry. Enough water will be taken through a crack before the crack is filled to attack and injure the steel.

Again, many engineers believe that by increasing the steel reinforcement the cracking of concrete will be prevented and the concrete also be made watertight. The speaker has long contended that imbedding steel in concrete may or may not injure the concrete. We appreciate that this is a rather bold assertion. To elucidate this theory, and, in fact, to better understand the deeper, more scientific, more fascinating side of waterproofing engineering, we beg you will indulge him in a brief analysis of moisture.

In this connection the speaker will draw a comparison between concrete with steel imbedded therein and a geological stratum. Moisture is creative and it is destructive. Of all forces it is the greatest. Nearly two-thirds of the globe is water—a wise provision of nature. Moisture generates heat and, in the generic sense, there is no heat without moisture. Rust formation is an explosive force even greater than that of freezing water. Iron is one of the most important and the most abundantly distributed chemical elements in nature; purposely so, if we may so express it. Iron has a wonderful affinity for moisture, which it will draw through many feet of rock and soil and, eventually, deep down into subterranean rivers, lakes and seas, of fresh or salt, hard or mineral, cold or boiling water, which in its further course of percolating through the earth's varied strata originates chemical action—heat, ignition, combustion—the expanding, pent-up steam and gases finally bursting in a volcanic eruption.

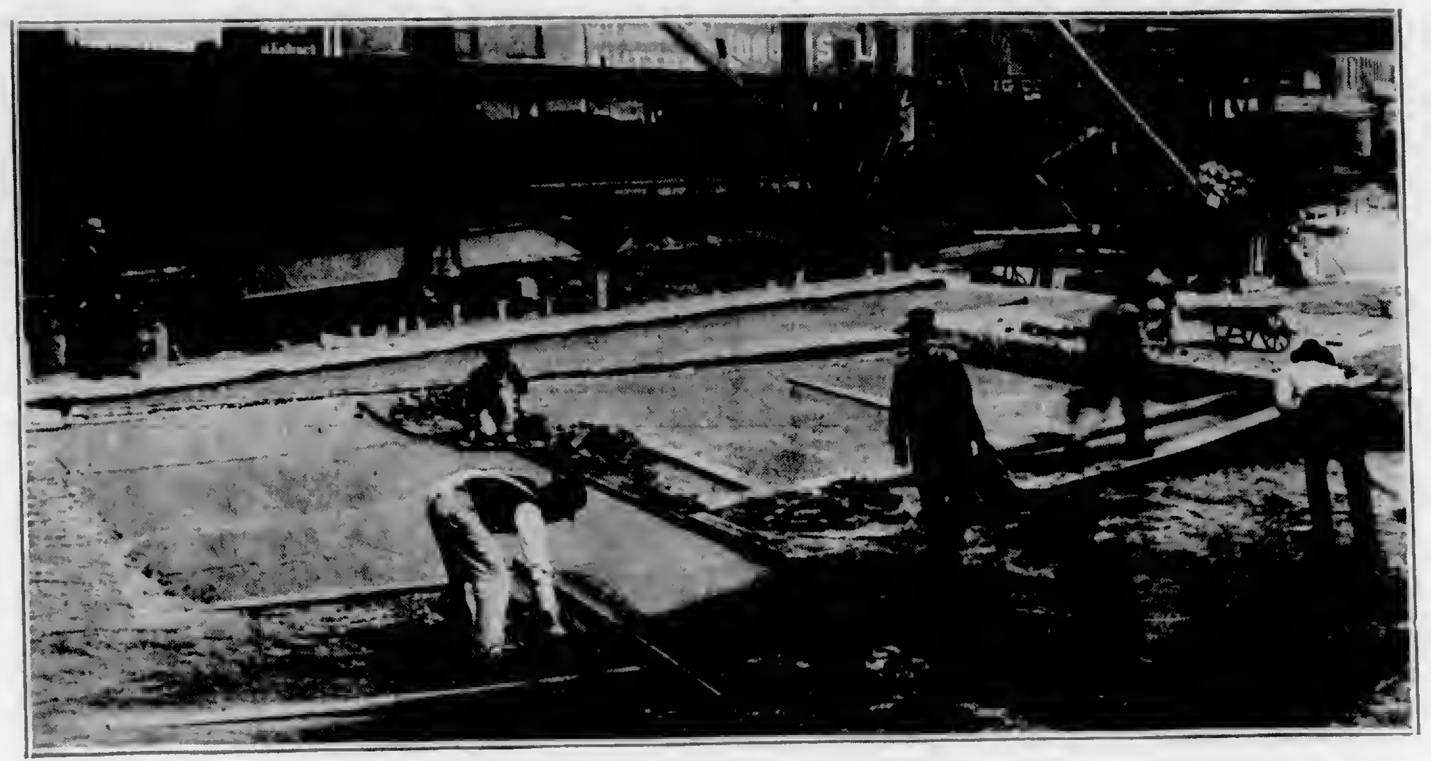


Fig. 4. On Flat Work

The laws of nature are inexorable and always remain the same no matter in what new form they may be expressed. In the pride and glamor of our marvelous artificialities we sometimes get so far away from natural law or first principles that we must go back to locate ourselves, as it were, and start anew.

For instance, in taking sand, stone, lime, cement—all earthy matter—and forming them into a hydrated material, to which we then add iron, we are simply forming a typical geological stratum, all the elements therein (particularly the steel) having, in a greater or less degree, a strong affinity for moisture. We incorporate the steel to strengthen the cement, or the cement to protect the steel, but fail to take the next step forward and protect the cement. Adding more cement to it, in the form of cement plaster, is not adequate protection. What is the natural result? Moisture is readily absorbed by the cement, either by capillarity or through cracks, while the greater affinity of the steel alone would, and does, of itself, draw moisture through 2 feet of cement. The moisture in passing through the cement takes up certain salts injurious to the steel. When the moisture reaches the steel, chemical action ensues, heat is generated through decomposition or corrosion, the pent-up gas (liberated hydrogen) escaping by bursting off a brown, infinitesimal, volcanic cone, which we call rust.

And thus we have expressed, only in a different way, the same changeless natural law underlying the volcanic eruption. We are at the exact point in the circle whence we started, only, spiral-like, a little higher up. In both cases, i. e., in the earth and the cement, the iron is imbedded and out of sight, and no one knows what degree of change in it has happened. We do know, by the natural law, that some change is occurring to the steel imbedded in the cement. We know that steel, imbedded in cement and kept dry, will

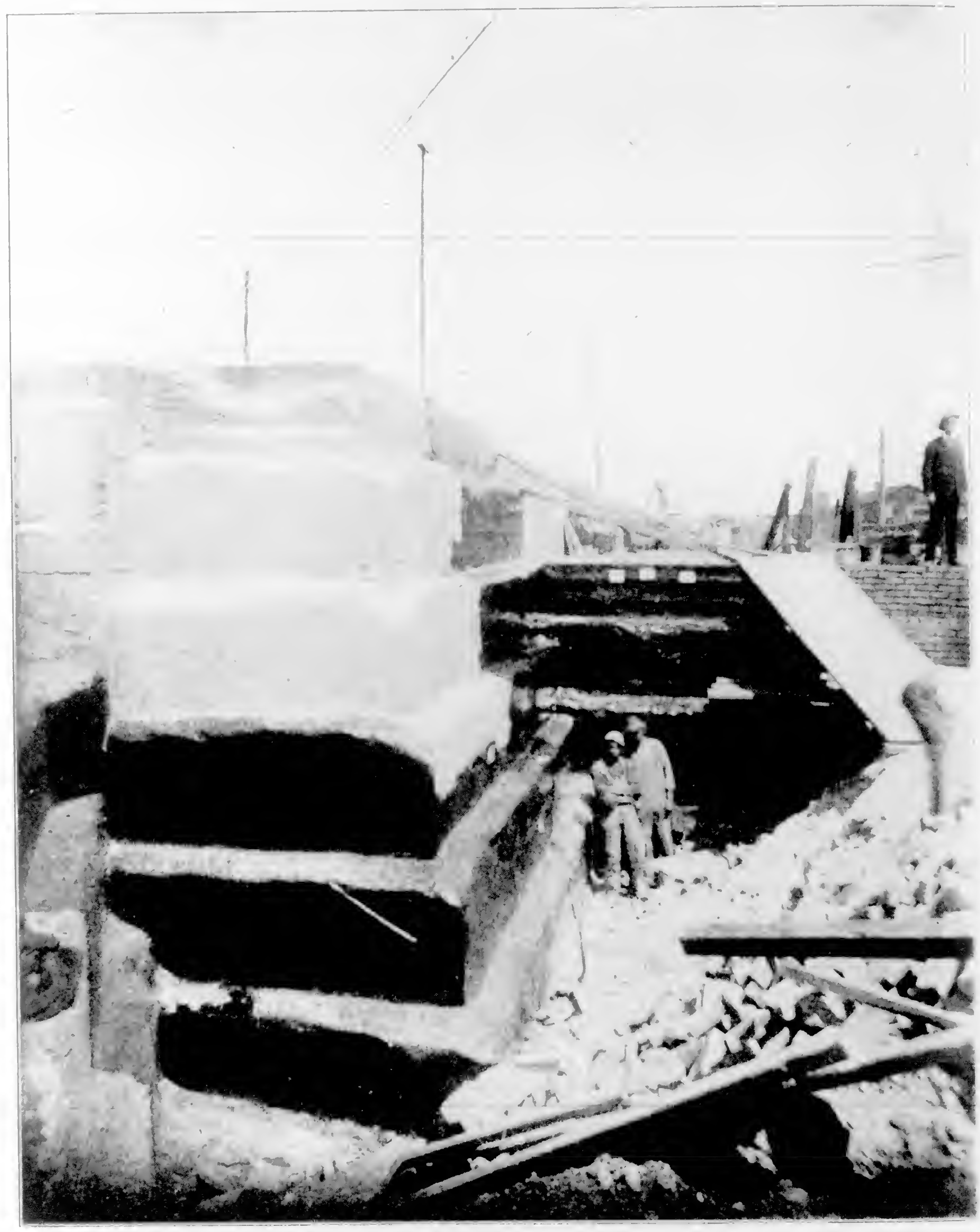


Fig. 2 A Case of Poor Waterproofing

indefinitely retain its purity and strength. We know also that moisture, reaching the steel, creates corrosion. The immediate effect is to destroy the bond between the steel and the concrete. The heat and expanding gas from decomposition (which is progressive) press the cement away from the steel. There then no longer exists, in fact, steel-reinforced concrete, but the very opposite, and a menace to life and property, which may eventually end in a collapse. If there is a particle of iron in the plaster on the ceiling and walls of this room, it will make itself apparent by a brownish, raised spot or scale as the result of moisture in the air attracted by and decomposing the iron.

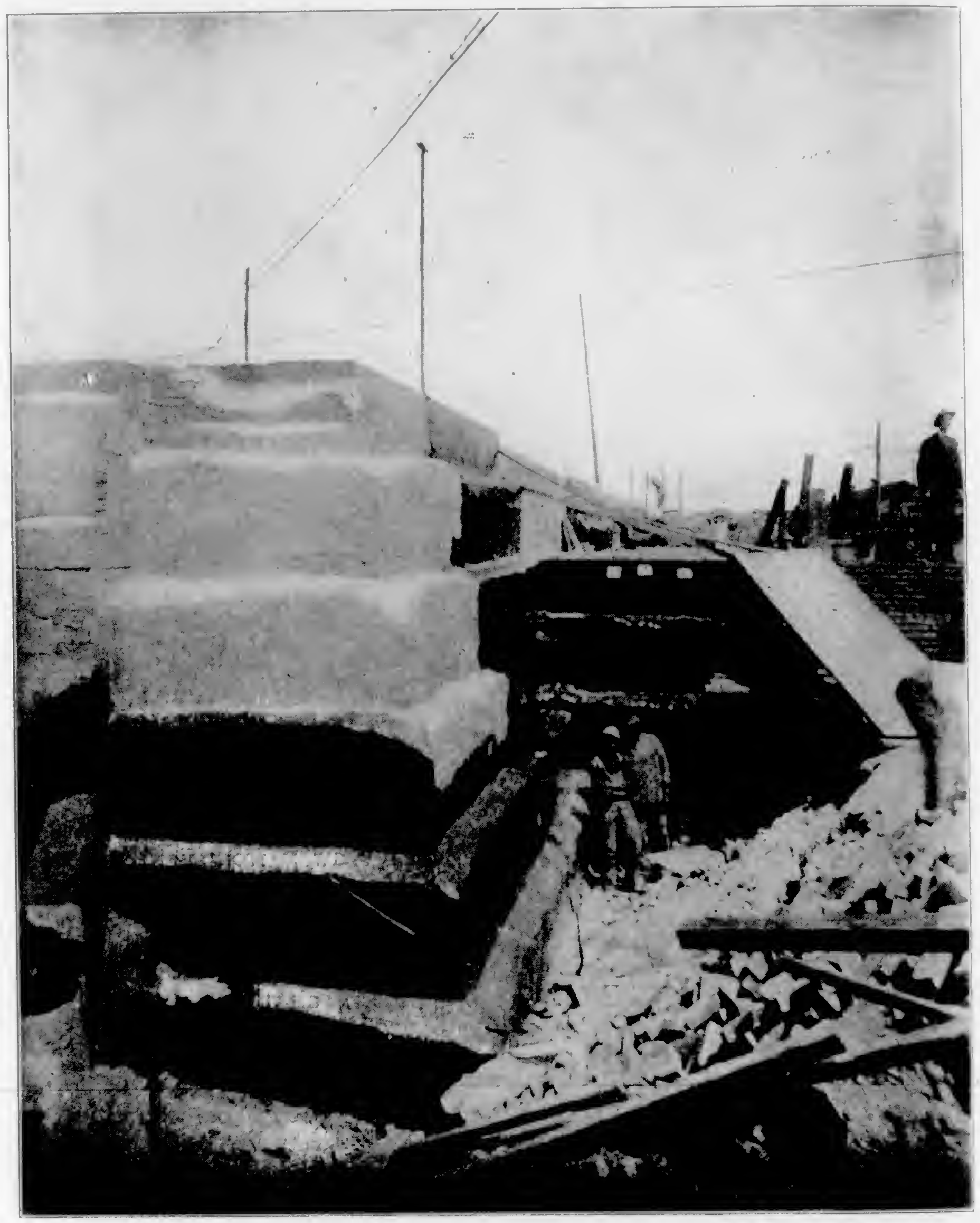
It is said that no one with an imagination will commit a crime. It seems incredulous if what has been just said be true, that any one with an imagination would add to cement or concrete in the mixing, salt, iron, slag or cinders. The same may be said of unthinking engineers and architects who would waterproof by using cement-plaster compounds. Moisture percolating through cinder-concrete will form what is commonly termed lye, which will soon eat through any steel wire, rod or girder. Because of its lightness, however, but without regard to its chemical fitness, cinder concrete is extensively used for floors—the very part of a structure most apt to collapse. Waterproofing concrete floors is a rarity, on the assumption that they are sufficiently watertight. Possibly so, but it is not the quantity of water which flows over or evaporates from the floor surface, but the small quantity which, from time to time, reaches below the surface, where it remains longer than elsewhere and is unseen, that is decaying the imbedded steel.

Waterproofing arches is still widely looked upon as a wasteful expenditure, while the waterproofing of the masonry or concrete encasing the steel columns of our tall office buildings is considered the essence of refinement.

Steel-reinforced concrete is yet but an experiment. Nor do we know the life of the modern steel office structure. One thing is sure: that the security and life of its steel skeleton depend upon how far the columns supporting the structure are at their base, rotting from electrolysis or moisture. We do not know, because we do not see, but that they are decaying is true. While painting exposed steel tends to protect it, paint prevents the bonding of the steel and cement. The life of a masonry structure is indefinite. This will better explain our first statement that imbedding steel in concrete or masonry may or may not be dangerous. It is certainly safer that steel be always open to observation and minute inspection, as, for instance, on a bridge. As gangrene in the flesh or bone will kill the living organism, so will diseased, decaying steel tend to eventually destroy the cement in which it is incorporated. Evidence in this direction is abundant if we can stop long enough in our rush to accomplish things to carefully consider it.

In the proceedings of the twenty-eighth annual convention of the American Institute of Architects, 1904, in a discussion regarding steel cage construction, Mr. Geo. B. Post, the distinguished architect, said:

"I want to say one or two words more. I meant the statement in the outset in regard to steel cage construction and its durability, not to a possible construction made with the greatest possible care, but to construction as I have seen it going up in the city of New York during the last two years, where the iron columns were given a very light coat of paint, very little attempt made to protect the joints. I presume that the great mass of joints will remain for a great period perfectly sound and safe, but the several hundred bearing joints in a building put up without any great care, put up, it seems to me, with a good deal of recklessness in a great many cases, with no protection except 8 inches of ordinary brick-work, I don't believe they will stand for any serious length of time with perfect safety. I don't know if you gentlemen have had the experience with brick walls that I have. I have seen the water in a northeast storm in the city of New York go through a four-foot brick wall and run down on the inside of its surface as though there was nothing there—a wall 150 feet high, exposed to a northeast gale, the water went through the four-foot wall at the second story and ran down on the inside, the wall being unpainted. The condition of a beam encased in cement and in a foundation is a very poor guide for what will occur in a joint on a flat, exposed wall, with only 4 to 8 inches of unpainted masonry. Every time that a storm comes, that brick work becomes soaked with water and will remain soaked for a considerable time. I should not hesitate, individually,



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In further and stronger evidence there is submitted the following extract from a very recent report (dated September 11, 1906) to the Structural Association of San Francisco, by a committee appointed to make an examination of certain cases of corrosion of metal in cinder-concrete floors:

"The cinder-concrete is somewhat porous, with occasional voids, and also contains coal, from dust up to lumps 0.75 inch diameter. Rust spots occur in the concrete, and where such spots are in contact with the metal, the corrosion is severe. The rust spots are sometimes an inch across, quite soft and easily removed by the fingernail. Occasional splinters of wood occur in the concrete, which show that the heat was not severe, as the wood is not charred. From the position of the floors it is certain that no water has reached the concrete since April 18 and that the corrosion was prior to the fire, but it appears to be more marked where floors have been exposed to rains since the fire. The corrosion is irregular in amount. In some cases the expanded metal is only slightly rusted, and in places it is entirely destroyed; several places were noticed where a small semi-circular patch had been removed from the edge of a metal strip; also at times it crossed the surface of the strip in a line, which suggested that it followed a surface crack in the metal. There seemed to be a tendency to corrosion at certain points in the diamond mesh, which would indicate that the metal had been strained in the process of setting and expanding, but there is not positive proof of this.

"The extent of the corrosion is great enough to seriously endanger the safety of the floors, and it is not probable that the floors would have supported their loads more than one to three years longer."

The committee recommended that their association try to have the building laws amended so as to exclude the use of cinder-concrete on floor slabs or for fireproofing. The protection of the floor from moisture or water, however, seems never to have occurred to the committee.

We do not want to get away from the initial point in this paper, namely, that in the formation of steel-reinforced concrete we are simply transferring certain chemical elements with no change in principle, and must needs go a step further. The suggestion occurs, therefore, that we must treat the new form of the structure as we would a living thing—a thing that moves—if we expect that particular thing to be long of safe service; otherwise we revert back to the crudity of the same first principle, linking the eruption of the volcano with the formation of rust. So considered, therefore, we again inquire, Is or is not steel a menace to concrete?

We need not dig deep into chemistry or physics to substantiate the facts. need only take the overt fact, the evidence of our eyes, based on common sense.

If moisture is the thing, as it undoubtedly is, then moisture is the thing to be counteracted. Therein lies the prevention. The real importance of

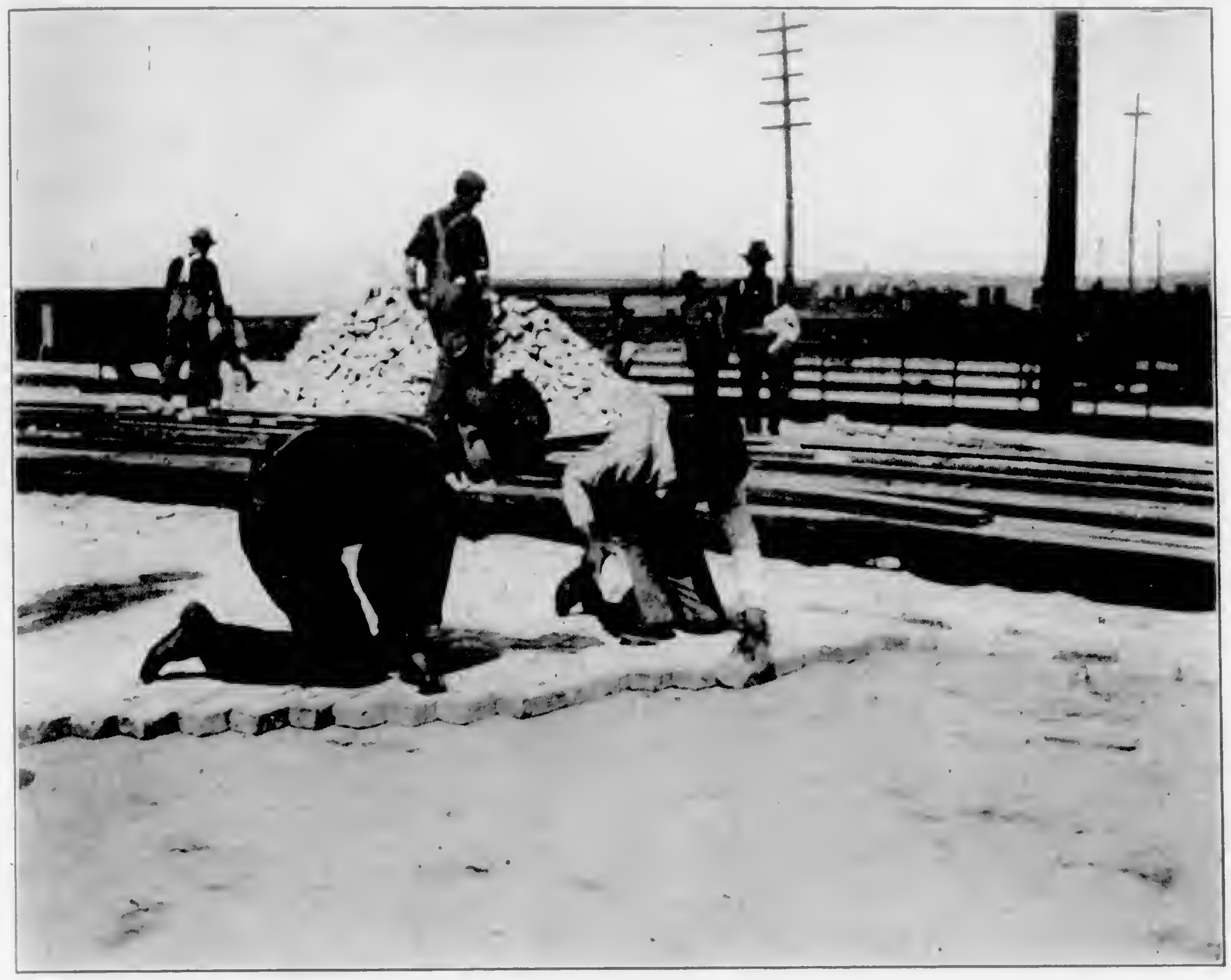

Fig. 3. On Flat Work

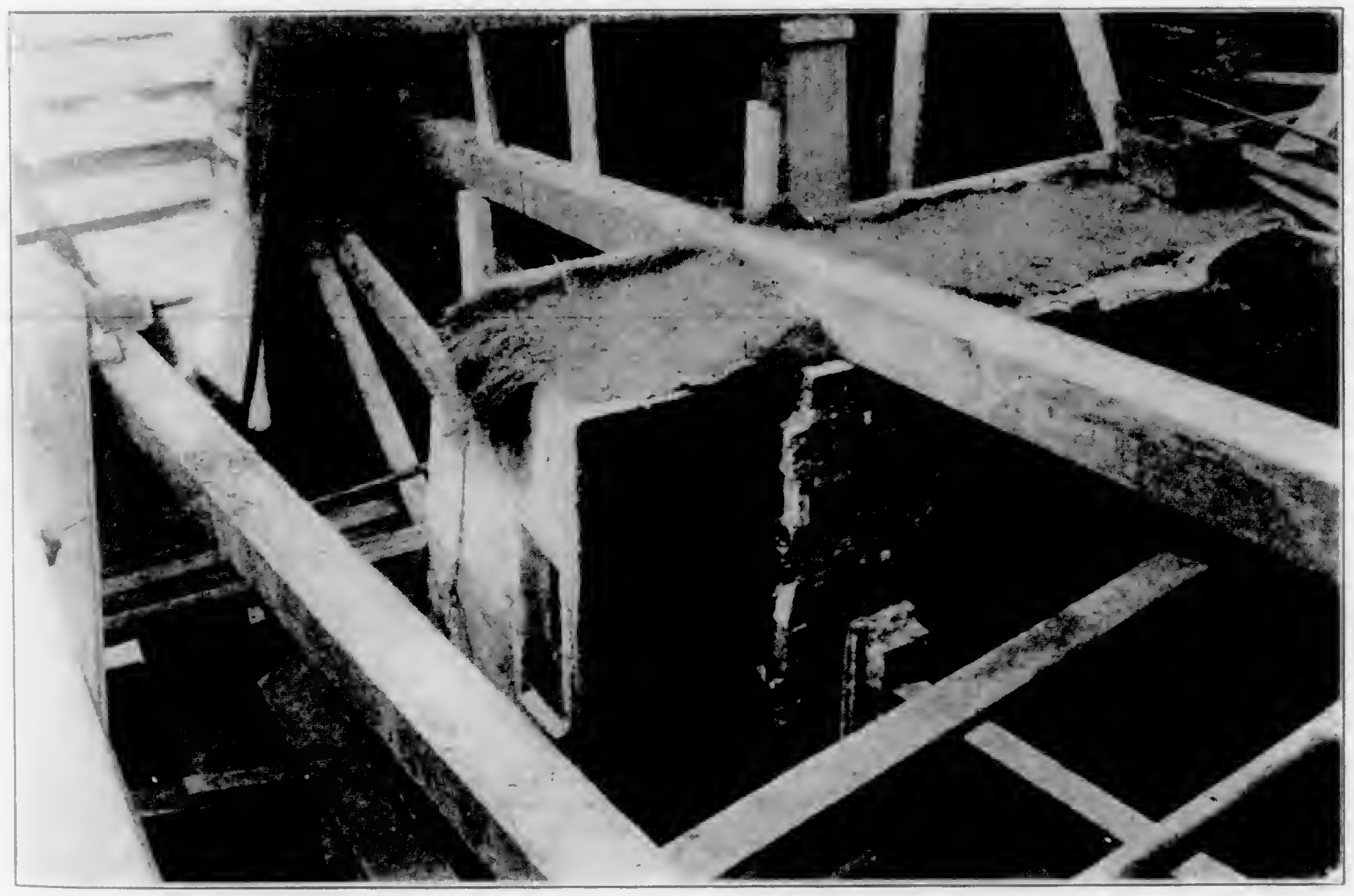

Fig. 5. On Wall Work

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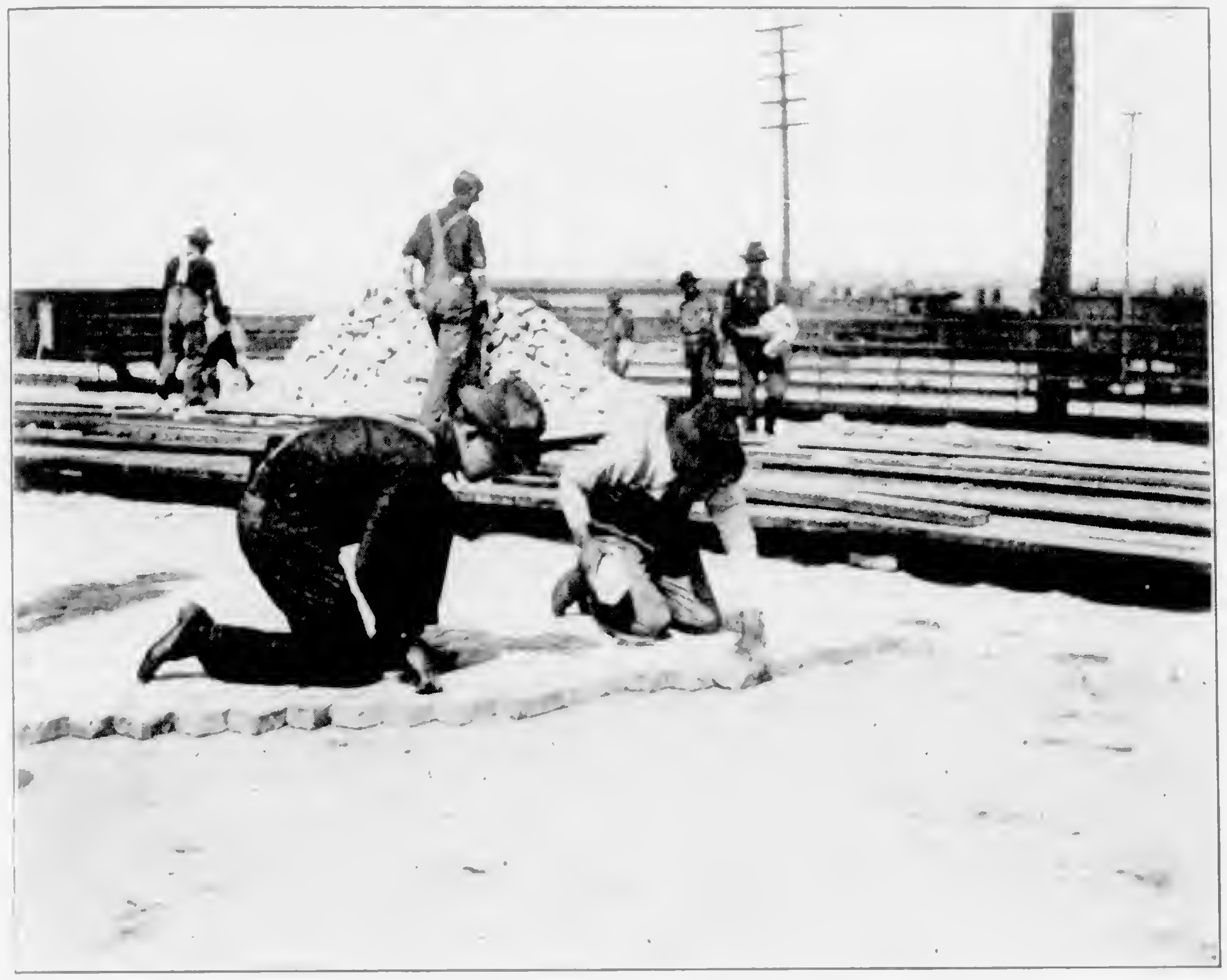


Fig. 3. On Flat Work

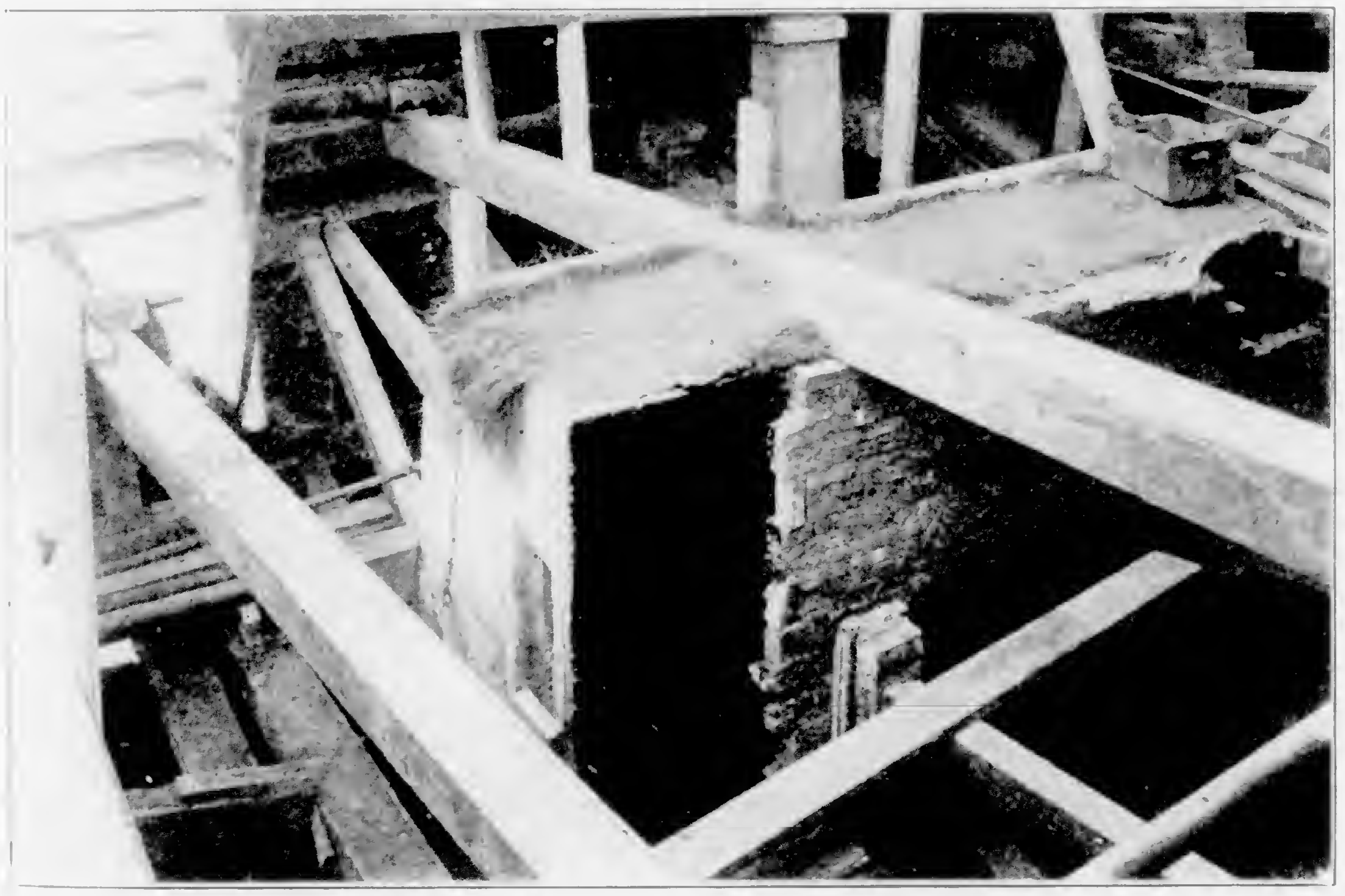


Fig. 5. On Wall Work

waterproofing, therefore, is not simply in keeping water out of buildings, but in protecting and preserving the imbedded steel.

Another very serious factor is this: Concrete is not an insulator and is not proof against electrolysis. The New York Herald of Sunday, August 4th, contained a page-illustrated article in which the above assertion was made so startlingly clear, supported by valuable tests, that it is well worth reading. If so-called "water-tight concrete," in itself or by the addition of cement plasters or similar compounds, is not proof against electrolysis, no estimate can be made upon the future damage which the use of such methods will entail.

The real theory of waterproofing is what? It is insulation. It means to separate, to get away from. Insulation and waterproofing are correlative. There can be no natural waterproofing without insulation. It is a natural law. Therefore, any other waterproofing would seem to be erroneous—how could it be otherwise?

After due consideration, therefore, and recognizing the fact that so-called "water-tight concrete" or cement plaster or washes are not in themselves insulators, does it not seem necessary and logical that we seek some other method of waterproofing than to rely upon water-tightness in the concrete itself; that we get away from the concrete and provide something between the concrete and moisture, and between the concrete and the earth, to so protect and insulate it that water will not reach the concrete, whether it cracks or not? This brings us to the consideration of the second method, viz:

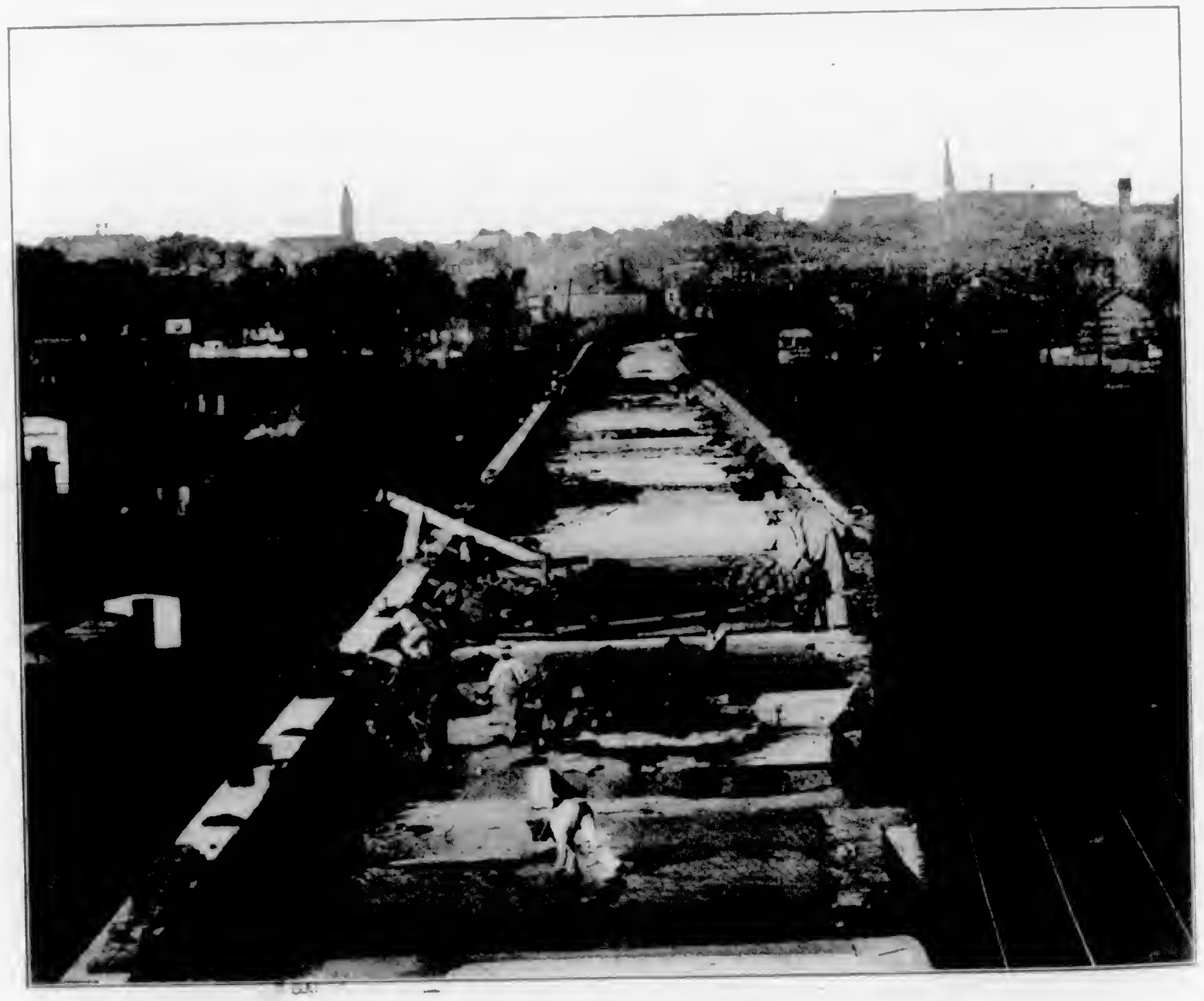


Fig. 7. Preparing Surface

Protecting Concrete With Something Apart Therefrom, to Make It Waterproof

Under this head come those materials and methods for preventing water from coming in contact with the concrete. Practically the first efforts in this direction were to coat the surface to be waterproofed with hot coal-tar pitch or asphalt, which, however, when set and cold, cracked and separated with any settling or cracking of the masonry. Burlap was subsequently used to reinforce the pitch or asphalt, without, however, preventing them from cracking, and the burlap, being of itself not waterproof, did not give waterproofness. Later on, there came into use for this purpose tar paper, which, however, lacks pliability and tensile strength. Tar and tar paper have been extensively used for waterproofing in the past, simply because there was nothing else open to the profession. It was not until recent years that any serious effort was made to place waterproofing on a scientific basis and to make materials specially adapted to the various conditions, materials which would not become brittle or be injuriously acted upon by water, the salts in the earth, alkali in cement, etc. The result of this specialization has been to greatly improve methods, and to open to the profession products for difficult work and special conditions, considerably in advance of old-school materials.

There are also used for waterproofing, mastics composed of coal-tar pitch, or asphalt, mixed with sand or torpedo gravel, resembling somewhat, when finished, an asphalt pavement. Mastics on floors, especially on bridge floors, where there is considerable vibration, soon separate from walls, steel columns and girders. If the mastic is made soft enough so as not to crack in winter, it becomes too soft to bear the load of traffic in summer. The chief objection to mastics is that they crack clear through, with any contraction and expansion or cracking of the masonry or concrete surface, of which they become an integral part when applied hot thereon.

Specifications also frequently require that the interior surfaces of foundation walls and floors shall be given one or two coats of some waterproofing paint. The paints might be excellent materials in themselves, but their use for such a purpose is a sheer waste of time and money as they cannot possibly prevent, for a number of obvious reasons, the percolation of water through the wall, or protect the imbedded steel. There are also now on the market a number of what are termed "textile" waterproofing materials, which, on examination, will be found composed, in many instances, of simply burlap, i. e., ordinary commercial bagging. The fiber is vegetable, is extracted from the bark of trees and is very perishable, especially in underground conditions. The apparent strength of such materials misleads one into using them, whereas strength alone is not, by any means, the first essential in a waterproofing material. These saturated textiles or baggings are, in a measure, going backward to the old-school method of incorporating burlap with pitch or asphalt to reinforce it as steel reinforces concrete. There is a clear distinction, however, between the principle and results to be obtained in reinforcing concrete with steel, and reinforcing waterproofing with burlaped textiles. The two should not be confounded. Otherwise it would be advisable to reinforce the bitumen with copper mesh. The treated or saturated burlap is no more waterproof, especially for water-pressure work, than when originally used to hold pitch or asphalt on a wall. This can be easily tested by placing a single sheet or thickness of the treated material under the slightest water-pressure, when it will be found, within a few hours or days, that water easily passes through the interstices of the material. A woven fabric has never proved superior for waterproofing, even though it be canvas, because the fibres pull against instead of with each other, resulting in the opening of the interstices and the usual splitting of the fabric.

The best material is unquestionably a strong, fibrous felt, made in itself, i. e., in one sheet, absolutely impervious to water by a process of saturation and coating with materials specially adapted to withstand the injurious action of water, and particularly all underground conditions. It is then practically an impervious membrane or skin through which, of course, in one sheet, water will not pass. As many layers thereof as the conditions require can be then cemented or veneered together with a waterproof bitumen-cement, not too weak or hard and brittle for the felt, but as strong and elastic as the felt. This forms a waterproof stratum so strong, tough and pliable that, without injury, it can be readily pulled, bent, turned, twisted, etc. Whether in a building foundation, covering the floor of a bridge or enveloping a tunnel,—it readily conforms to the final conformation of the surface waterproofed, from which it is practically apart and which it insulates and protects under all conditions, settlement, jars, shocks, cracks, expansion, contraction, heat, snow, ice, water, etc.

The speaker some time ago termed this "the membrane method," and firmly believes it the basis for the development of a perfect waterproofing. It is not, therefore, primarily a question of material, but of method.

We previously advanced the theory that our structures should be treated, in the waterproofing sense, as things that live, i. e., things that move. We would again, therefore, go back to locate some first principle of natural law as a guidance, because there is nothing made by man that its prototype in some form is not somewhere in nature. No man ever devised an insulation for the most intricate electrical machinery as perfect as the insulation of the human brain—the dynamo of the universe. In seeking a guide, therefore, in our present problem, we find throughout nature no waterproofing which is hard or set or vitreous, because nature waterproofs only living things (things that move), not dead ones or inorganic ones, which do not require it, but, by moisture, heat and decomposition are resolved back into carbonate of lime. Therefore, all things that live and move require, and are by necessity protected with, a flexible, elastic skin, yielding to growth, movement, action. Therein lies the origin, the first principle of waterproofing, natural or artificial. Can any other principle be right?

In the very beginning of germination, nature begins to cover, insulate and protect, with an elastic film, skin or membrane, the life germ. This law prevails through the whole line of plant and animal life, from a grain of wheat up to a mastodon. Puncture this protecting skin or membrane and there immediately ensues decomposition (or corrosion) in the exposed flesh. So long as the plant or animal lives, whether one or a hundred years, this yielding membrane perfectly protects. We ourselves take the tough hide and the fine elastic skin of animals to protect our feet and waterproof our hands, both our own and the artificial protection readily yielding to every move of the foot or hand.

If a chicken came forth in a coating of soap and alum, its usefulness would end with its appearance. Nor do we waterproof our feet or our hands by immersing them in a bath of cement, which would make them set, rigid and useless. Yet, is this not essentially what we do when we would protect and waterproof our structures, which must settle, contract, expand and move, with an injection of hardening fluid to embalm them, thus preventing instead of providing for the natural functions of the masonry or concrete, and also imperiling both the waterproofness and the usefulness of the structure? Obviously, therefore, a natural waterproofing is one which—skin, hide or membranelike—yields to the natural contraction and expansion of the structure and protects it by preventing water from reaching it. If, therefore, the skin or membrane theory is logical, natural and right, it then simply remains to develop that theory and to scientifically perfect the materials necessary for its practical success.

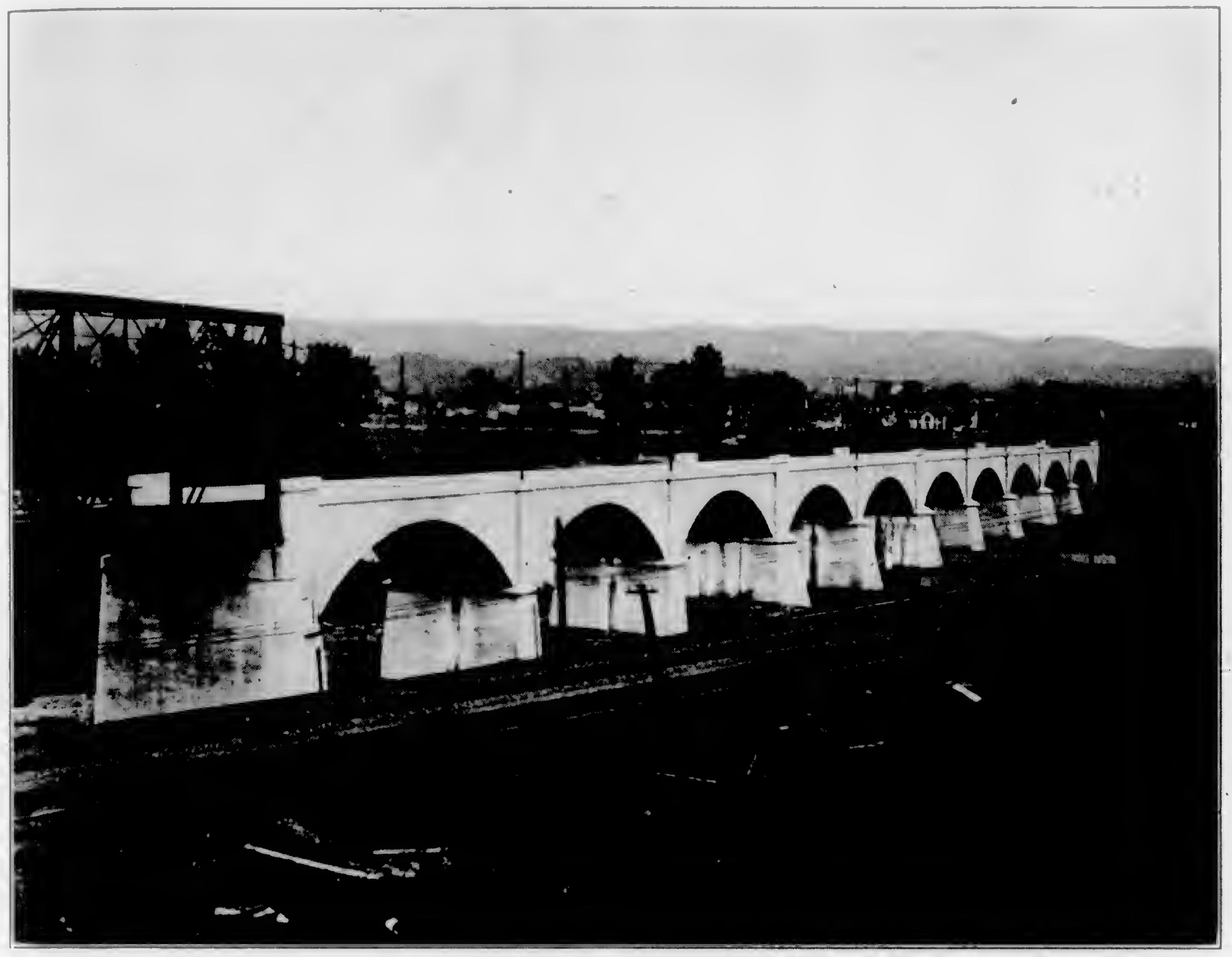


Fig. 8. A Saved Viaduct

Considered in this light, i. e., following the membrane idea, and coming down to the actual work of preventing water from reaching the structure and insulating it, we would submit the following observations and rules:

Practical Application of Waterproofing

First. No waterproofing, especially for difficult and water-pressure work, should be undertaken when the temperature is below 25 degrees fahr.

Fifty per cent better work can be done when the weather is warm. In cold weather the felt sheets are difficult to handle, the hot bitumen-cement chills and congeals too quickly, especially when it comes in contact with a cold wall, and it is difficult to obtain the perfect cohesion of the different felt layers.

Second. Allow sufficient time, room and accommodations in which to properly apply the materials.

The reverse of this rule, however, is the common practice. No other part of construction work depends more upon the perfection of details than waterproofing. Yet there is no part of such work which receives so little appreciation and consideration. To not make every provision for facilitating waterproofing work is a great mistake. No matter how conscientious a workman may be, he cannot, for example, do good work on a wall from the outside if the excavation is not wide enough from the wall to give him room in which to work, or on the inside of the wall if he has scarcely light or arm room, and is crowded upon by workers in brick, in cement, in stone, in steel, etc.; nor on the roof of a subway, under railway tracks, if there is not sufficient head and working room between the roof of the subway and the base of the tracks, etc. This lack of consideration, in not providing time, room and the necessary facilities, and in allowing contractors to apply the materials in any haphazard way, so long as the materials are applied, is the real cause of so many past failures. Nothing pays better than good waterproofing, and nothing is more disastrous than poor waterproofing. Once water gets behind waterproofing, no waterproofing would have been preferable.

Third. Design the structure to properly receive waterproofing.

The design will either make impossible proper waterproofing, or will invalidate the best materials after they are in place. The line of waterproofing should be adapted to the nature and purpose of the structure, and be logical with the point of water-pressure.

As an example of faulty design, there is submitted the following sketch, frequently used in trade pamphlets of waterproofing materials. It has, in fact, been adopted in the department of buildings in one of our largest cities, and shows how easy it is to officially indorse and follow a bad principle.

Fourth. Specify always that the waterproofing shall be done only by experienced and skilled labor.

Roofing, for instance, is not waterproofing. An excellent example of this is shown in Fig. 2, in which "waterproofing" is applied to the back of a retaining wall. The contractor, a roofer, was so proud of his work that he had the picture taken to illustrate it. It requires no trained eye to see that the surface of the retaining wall is, in the first place, too rough, and is not rightly smoothed, to waterproof; that the corners of the wall and the edges of the steps are round and badly broken instead of being neat and square, making it almost impossible to fit the layers of felt around same. The waterproofing itself is slovenly and irregularly applied, underlaid with air pockets, not properly lapped or smooth and tight. No skilled waterproofer would, at the outset, have applied the materials to such a surface. He would have refrained from doing so until the surface was properly prepared. This is also a case where possibly the engineer did not himself know—but engineers cannot be expected to know all things.

Fifth. Thoroughly protect the waterproofing during and after application.

The average laborer is no respecter of waterproofing, especially an elastic waterproofing, and will walk on it, roll wheelbarrows over it, throw tools, lumber, brick, stones, cement and debris thereon, to its serious damage.

After arches are waterproofed it is a common mistake in placing the fill to not begin the fill at the base of the arch, but to dump it on the crown. The fill thus often breaks through and tears or strips the waterproofing from the arch surface. It is false economy to not always permanently protect waterproofing with a layer of brick or cement mortar. Examples of such a protection are shown in the accompanying figures:

Fig. 3 shows bridge floor waterproofing protected with hard brick, laid flat and fairly close in a thick coating of the hot bitumen-cement, the joints being filled with the cement, with which the bricks are also finally coated. Over the brick is placed sand or stone ballast, in which rest the ties for the rails.

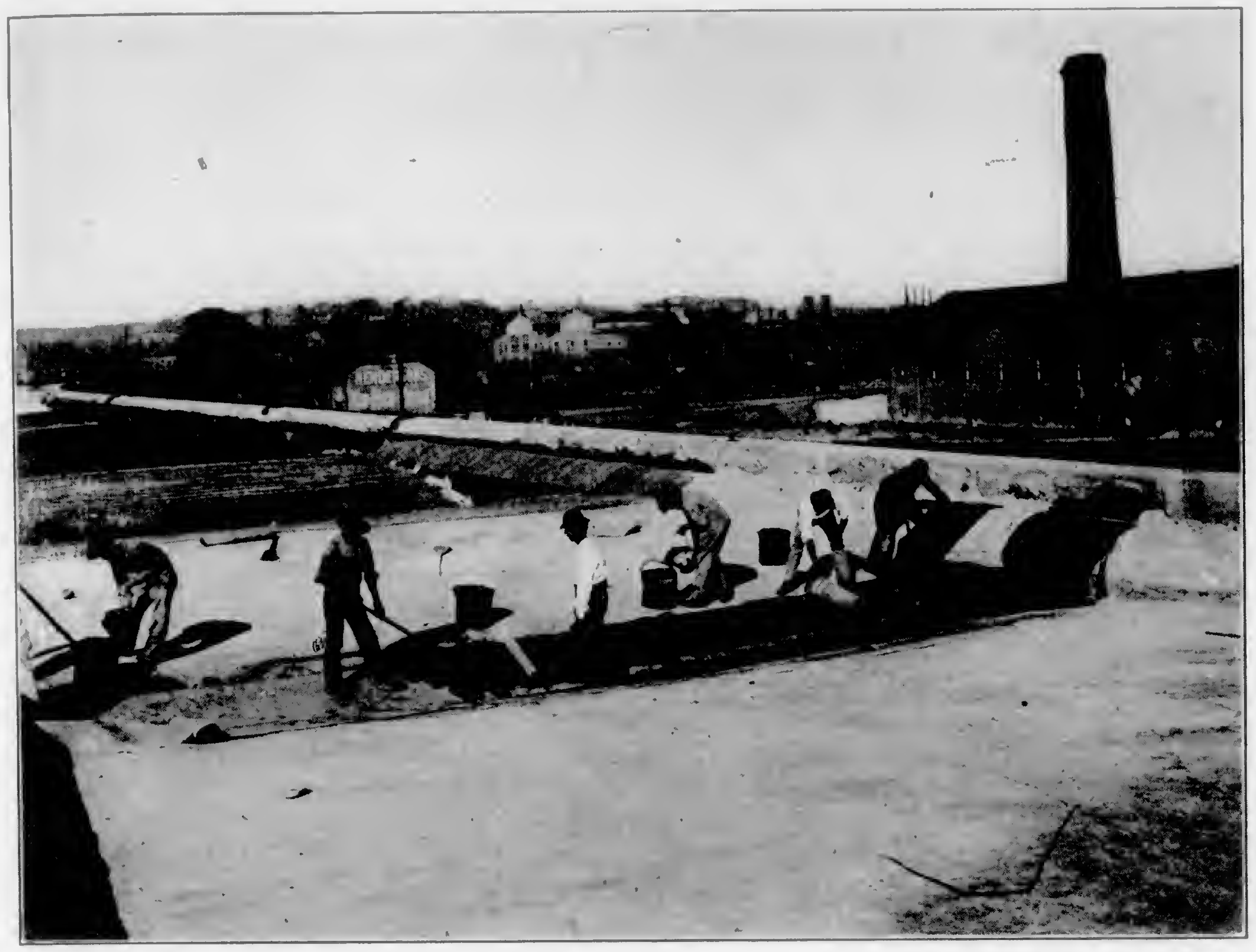


Fig. 6. Rolling Felt After Mop

Fig. 4 shows another method of protecting the waterproofing. The man in the middle foreground is placing cement mortar directly over the waterproofing; while the man beyond him is laying brick on top of the cement mortar. Immediately to the right of the brick layer is seen another course of cement mortar which has been placed over the brick.

Fig. 5 shows the protection of wall waterproofing by a 4-in. course of brick laid against the wall in cement mortar.

Fig. 6 is an example of the best method of applying the felt, especially on flat surfaces. It shows the felt being rolled after the mop which spreads on the hot cement. Rolling presses out air bubbles and insures better sticking. A workman follows, rubbing and pressing the felt over the entire surface to insure thorough adhesion to the under layer. Just letting the felt fall flat into the hot bitumen-cement is not rolling it into the hot bitumen-cement.

Fig. 7 shows a bird's-eye view of the series of arches, on one of which the waterproofing was shown to be in process in the previous picture, No. 6. The man in the middle foreground is trowel-smoothing the concrete surface for the waterproofing.

This concrete viaduct (Fig. 8), with its graceful arches, was erected in 1902 without being waterproofed. The result was that within the short space of three years the condition of the viaduct was such that, in order to save it, it was necessary to remove a greater portion of the top surface and place thereon waterproofing which should have been applied in the first instance. This condition was brought about by the weep pipes at the bottom of the reservoirs between the arches filling up from cementation, permitting the reservoirs to fill with water which percolated in streams through the concrete. The water in the reservoirs, and that which saturated the body of the concrete in the arches, froze in the winter, causing the arches to spread and split, thus endangering the entire structure. Even at the present day a great many engineers and architects look upon the waterproofing of viaducts and arches as unnecessary. In contradiction, can any evidence stronger than the above be cited? A membrane or stratum of waterproofing over the arch under the wearing surface not only prevents the unsightly discoloration of the arch, but preserves both its beauty and integrity.

Sixth. Inspect waterproofing at all times during application.

See that the materials as specified are used, and also that they are themselves up to standard; that the work is done carefully and skillfully, particularly in the out-of-the-way small difficult places; that the laps are not made 22 inches when they should be 24 inches; that the hot cementing material is applied, not one fourth or one half, but the entire width of the lap; and that it is applied hot, quickly and thoroughly; that full, clean and well protected connections are provided; that the waterproofing is well protected at the end of the day's work; that no work is done except in the presence and by the approval of, the special inspector appointed over the work.

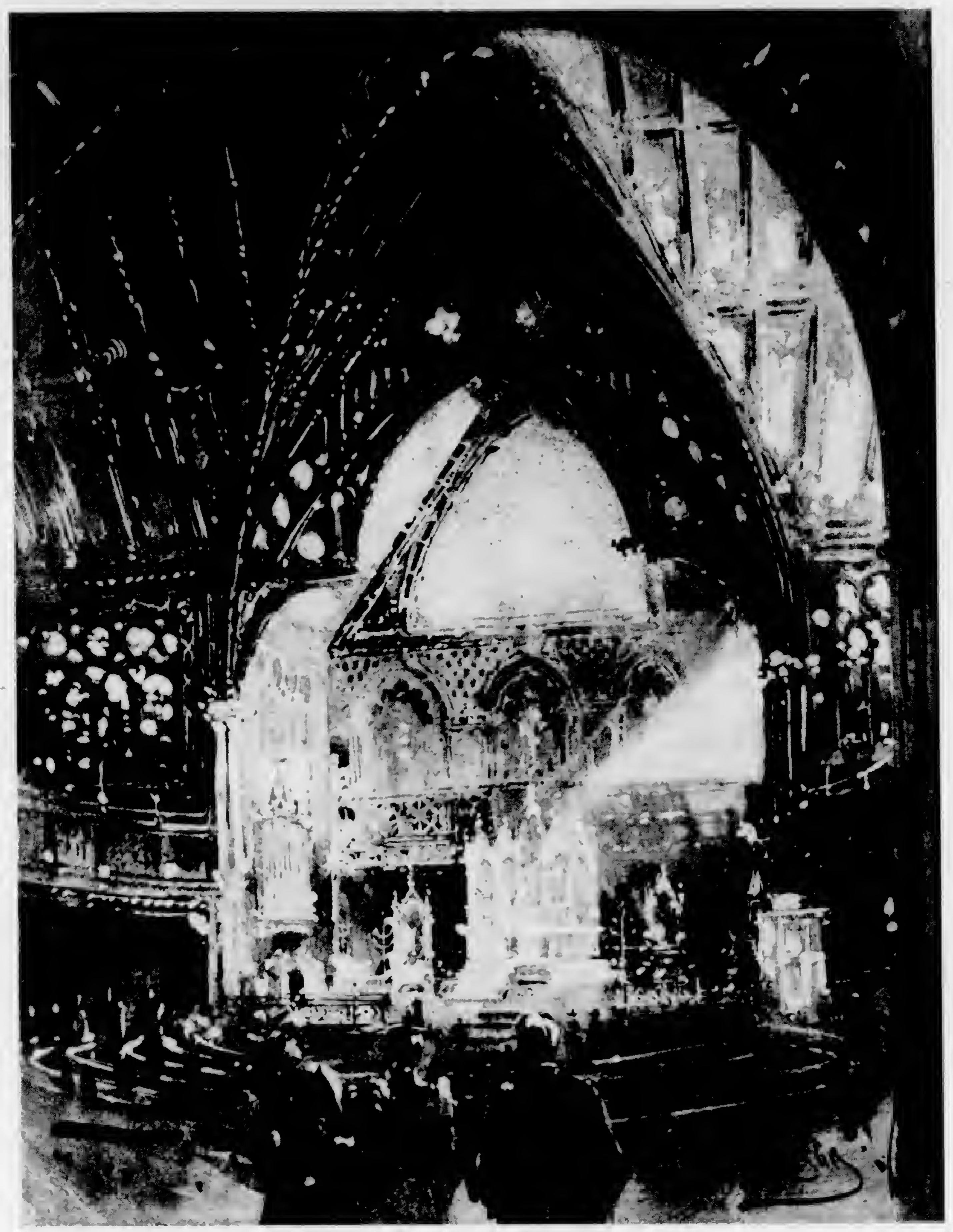
If the inspector is himself not thoroughly skilled in waterproofing he is of no value. He might be an expert in steel or cement or caisson work, but without the right experience in, and the knowledge of, waterproofing, the waterproofing men under him could easily deceive him in important details of the very thing which is to make permanently safe and valuable the steel and cement. If the waterproofing is very important, expert direction and supervision should be obtained.

Seventh. Do not depend on guarantees.

The speaker has always contended that a waterproofing guarantee is practically worthless. A roofing guarantee is of value because the conditions are entirely different. In roofing, the cause of and responsibility for leaks can be easily settled. Seldom, however, is there any recovery had under a waterproofing guarantee. Bonding companies are averse to supporting waterproofing guarantees because of the high risk. It will be found on close analysis that bonded guarantees do not, in fact, guarantee. Such, for example, is a bonded guarantee reading that the structure or surface to which the waterproofing is applied must remain "sound and stable."

The very purpose of waterproofing is to waterproof the structure or surface in the event of its not remaining "sound and stable." Such a guarantee, of course, means nothing, except that the bonding or other company assumes no risk, but shifts it to the owner of the structure, who himself then guarantees that his structure or wall will not crack or injure the waterproofing. The waterproofing should accommodate itself to the wall instead of the wall accommodating itself to the waterproofing. The best guarantee is work, intelligently, skillfully and honestly executed by a concern of reliability and reputation.

A strong case in point is a recent decision on a waterproofing guarantee by the United States Circuit Court of Appeals, Third Circuit, 144 Federal Report, 942. In a contract for the foundation of a building the specifications, after describing the waterproofing materials to be used, stated: "The whole to be made perfectly water-tight and guaranteed." On the completion of the foundation it leaked and payment was withheld from the contractor. The contractor contended that he had strictly followed the specifications and was not accountable for the result of the plans. The court upheld the claim of the contractor.



Sketch of Church Interior Shown at Portland, Or., Architectural Club's Exhibit

Eighth. Do not use a set or standard specification.

Each design must suit the exact conditions, and each specification must exactly suit the design. Using a set or standard specification frequently offsets the very purpose desired. It results in the customary but very serious mistake of placing the waterproofing details on the contractor. A contractor will apply anything that is specified, and, as a rule, is interested only in getting it applied as quickly as possible. Speed in waterproofing is undesirable and dangerous. The specification as to waterproofing, particularly in important work, should be clear and to the point in every detail. It should make the contractor responsible only for the proper application of the materials under the close observation and approval of the engineer.

In the final analysis, the sanitariness, soundness, safety, preservation, usefulness, symmetry and beauty of any structure depend upon protecting it against the destructive action of moisture.

Preventing Failures in Concrete Contruction

THERE is no doubt but that many of the failures of reinforced concrete structures can be traced directly either to mistakes made by careless workmen or to negligence in carrying out the orders issued by the superintendent. This fact was made particularly apparent by the first statement issued by the committee investigating the recent failure of the Bridgman Building in Philadelphia—to wit, "that the shores had been removed too quickly through a misunderstanding of orders." It appears that while the superintendent had instructed the laborers to remove some of the shores from the concrete work, this order is said to have been misconstrued, and all of the shores were removed, causing the partially green concrete work to fall, carrying the under floor with it, and resulting in the death of several workmen.

"We long ago realized the possibility of and the causes leading up to just such disasters, and in order to guard against them have had in force for several years a rule governing all of our work, according to which the shores supporting any reinforced concrete work shall not be removed until an order to that effect has been issued from our executive office," says Engineer H. Q. Kennedy in a recent issue of the Cement Age. "Headquarters is kept constantly in touch with the progress of the work by means of daily reports, which show just what has been done each day, and being enabled thereby to determine the proper span of time which should be allowed to elapse before the shores are removed.

"We believe that another one of our rules, that when concrete work is stripped of its forms, absolutely no patching shall be done on it until the work has been passed by our inspectors, could be easily followed by any one and would eliminate many of the causes of failure in concrete work, and at the same time tend to secure better and more careful work, even from the irresponsible ordinary laborers employed in this connection.

"It is customary to have all defective spots in beams, girders, slabs, columns, etc., patched as soon as the forms are removed in order to cover up those defects caused by careless workmen or by chance, which it seems almost impossible to eliminate where exposed surfaces are concerned and a very smooth job is required.

"But, it has happened too many times that when, upon the removal of forms, the under side of beams showed spots where the concrete failed to surround the reinforcing rods, they were patched immediately, thus making it impossible to tell just how bad the defect was, as the exterior showed only the surface of the patched spot.

"If every superintendent, foreman and other workman realized that no patching could be done until the spots needing it had been thoroughly examined and inspected, the result would be more careful work and the elimination of a most fruitful source of failure.

"We believe that a rule to the effect that no patching be done until the work has been inspected by a duly authorized city inspector ought to be embodied in municipal building codes."

* * *

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Unique Bungalow.

Plans have been prepared by Architect W. Carbys Zimmerman, 1101 Steinway Hall, Chicago, for a one-story bungalow, to be built at Altadena for A. F. Gartz. It will be erected under the supervision of Architects Hudson & Munsell of Los Angeles. The building will cover a ground area of 93.8x116.5 ft., inclusive of the interior court, which is 54.4x72.5 ft. The foundation walls, footings, terrace and steps will be of concrete and cement, and clay tile roofing. The exterior walls will be either of brick, concrete or studs, with metal lath and plaster finish. The front terrace will be 25x42 ft. The interior court will contain a pool, with fountain. Artificial stone columns will be employed along the sides of the arcade.

Engineers and Architects.

An interesting program was presented at the last regular monthly meeting of the Engineers' and Architects' Association, held at the Hollenbeck Hotel in Los Angeles.

Captain Amos A. Fries, president of the Association, was in charge of the meeting, and introduced the speakers of the evening. The subject for the evening's discussion was, "Ventilation." The program committee, consisting of Amos A. Fries, Geo. P. Robinson and Theo. A. Eisen, having previously selected Francis B. Kellogg, M. D., Harris S. Garcelon, M. D., Lieut. R. H. Miner, Gen. Chas. Forman, J. J. Bachus, Benj. F. Hulse and Franklin Booth to address the society, each was called upon to respond.

Much information was expressed by the different speakers relative to the methods employed, and the entire program was thoroughly enjoyed by those present.

Tragic Death of Architect Coplin.

A. Dodge Coplin, a well-known Oakland and San Francisco architect, met a tragic death on March 22, near Claremont park, Berkeley.

Miss Annette Deaner and Architect Coplin were returning from a trip to Contra Costa county in Mr. Coplin's automobile. According to the young woman's story, Coplin had started to get out of the machine, which he had stopped, when she heard a report and he fell to the ground. At first Miss Deaner thought that the report was from the muffler of the auto engine.

When she realized that something more serious had occurred she alighted from the car to find Coplin bleeding from a wound in the head.

Apparently Coplin's pistol, which he had put in his overcoat pocket, had fallen out as he stepped from the machine. He was senseless and Miss Deaner ran for help to the home of Mr. and Mrs. Fred Turton, several blocks away. There a message was sent to Roosevelt hospital at Berkeley, and Dr. Arthur M. McIntosh responded. Coplin was removed to the hospital where he died.

Since his divorce from Mrs. Sarah Luella Coplin, a music teacher, October 14, 1901, Coplin had been a man about town. Recently he planned to go East and closed his offices in the Bacon block. Coplin designed a number of picturesque houses in the Piedmont section of Oakland.

Goes to Japan.

James D. Schuyler, a well-known hydraulic engineer of Los Angeles, is on his way to Japan, having been appointed a member of a commission of engineers to report on an extensive power plant to be built in Japan, for an English syndicate, which intends to develop power for the operation of the street railways of Tokio and Yokohama and other purposes. The work will constitute the construction of several high dams and reservoirs, and will cause an outlay of about $5,000,000.

$500,000 Class A Building.

The financial district in San Francisco will be further improved by the erection of an eight-story class A building on the northwest corner of Sansome and Halleck streets, opposite the Bank of California. It is the property of Jacob Stern of Levi Strauss & Co., and when completed will be an absolutely fire and earthquake proof office building. The investment will total nearly $500,000.

Among the modern improvements to be installed is an auxiliary water system, whereby streams can be carried to the top floor under heavy pressure. A compressed air apparatus for cleaning the building will be one of the features.

The front wall will be of molded brick and terra cotta, the floors of reinforced concrete and the windows of heavy wired plate glass. Heavy vaults will be constructed, partitioned from the walls of the building by a concrete inner structure, which will be absolutely fireproof.

Concrete Wharves

City Engineer Turner has sumbitted to the Oakland City Council plans and estimates for the construction of projected wharves by the city along the western water front between the north harbor training wall and the Southern Pacific broad-gauge mole.

Turner's estimates are for two wharves, each one and a quarter miles long, 200 feet wide, average length of piles 40 feet and to cost $1,425,000. The same wharves with protected piles and concrete floors, concrete cylinders to protect piles, reinforced concrete superstructure, the engineer estimates, would cost $6,336,000.

The estimates include a slip which would be dredged 300 feet wide to a depth of 25 feet below water and to dredge a fan-shape approach to the same depth out to the channel, requiring the removal of 2,205,000 cubic yards of earth at a cost of $330,000.

Reinforced Concrete Bridge

That the Portland and Seattle Railroad is making use of the best there is in modern railroad construction is shown in their adoption or reinforced concrete for bridge work where that material can be used to advantage. Notable examples of this will be the viaduct in Vancouver and the bridge over the Klickitat river. The latter will be a single arch of a span of 160 feet. Being architecturally beautiful this will form a notable feature of the scenic value of the Columbia river. The Wallace-Coates Engineering Company of Chicago and Portland, specialists in this class of construction, have been retained by the P. & S. R. R. to draw plans and specifications and supervise the construction of this work. They have also been retained by the city of Spokane in the same capacity to replace steel bridges in that city with others or reinforced concrete.

Architect Drinks Poison

Henry Hyde Dwight, architect, who for some time had been living in Pasadena, committed suicide on March 26 after a warrant had been obtained by a bank in Pasadena charging him with having passed a fictitious check for $40.

When the constable arrived at the ranch house with the warrant he found Dwight in conversation with Hiram Weed, the administrator for the estate of Mrs. Dwight, who died about a week ago. Dwight said:

"I will go upstairs to my room and get my hat," and before the constable

could overtake him had swallowed a glass of water and strychnine, which had been mixed some time previously.

It was found that Dwight had, within the last two months, passed numerous checks and obtained various sums of money under false pretenses.

Architects' Meeting in Los Angeles

A special meeting of the Southern California Chapter, A. I. A., was held Monday, March 23 in the office of Architect Alfred F. Rosenheim, with the following members present: President C. H. Brown, Secretary Fernand Parmentier, John P. Krempel, G. A. Howard, Jr., Frank D. Hudson, J. Lee Burton, R. F. Train, A. F. Rosenheim, Theo. A. Eisen and B. J. Reeve. Chief Inspector of Buildings, J. J. Backus, was also present.

Communications were read from Glenn Brown, announcing the schedule of charges and requesting the Chapter's opinion before the matter is taken up by the next Institute convention; also another letter, acknowledging receipt of the Chapter's communication announcing the appointment of Mr. Rosenheim as a member of the nominating committee of the institute.

A communication was received from the Los Angeles Board of Public Works in response to the Chapter's request to be granted co-operation in the future in the framing of new clauses for the Los Angeles building ordinance.

A lengthy communication framed by Architect Theo. A. Eisen and addressed to the Board of Public Works, was read against the adoption of certain changes in which he made a vigorous protest to the present plumbing and electrical ordinances. His remarks against the adoption of these changes were well taken, and received the hearty approval of the members.

Mr. Backus presented drafts of several contemplated amendments to the building ordinance; one in regard to moving and making alterations and additions to frame buildings in fire district No. 2, as follows: "Frame buildings may be moved, but when finally located shall not be within ten feet of another structure on the same lot; to raise one-story frame buildings and build one story beneath, provided the new portion of the building be of "Class C" construction and provided further that the exterior walls of the new story be not more than sixteen feet in height above the level of surrounding ground. That additions and changes be allowed to the extent of 20 per cent of the value of the existing buildings, provided there be ten feet of space between the new and old part of the structure and any other building on the same lot; provided further that no improvement be allowed to a greater cost than $1500. That all new structures in District No. 2 be of Class A, B or C construction, except that it shall be lawful to construct outbuildings and open sheds of "Class D," provided they be ten feet away from any other structure on the same lot."

"The other amendment is in reference to the rat evil. The new measure provides for the construction of concrete or asphalt floors in laundries, livery stables, barns, cellars and such other places. That the space between girders, joists or walls in buildings in the fire limits should be constructed in such a manner so as to prevent the harboring of rats and other vermin."

These measures are now in the hands of the City Attorney, and the matter will come up before the City Council for ratification very shortly.

At the regular meeting of the Chapter, April 14, a banquet was held in honor of the visiting members of the State Board of Architects from San Francisco.

Plans Handsome Church

Architect H. M. Patterson of Los Angeles has drawn plans for a magnificent church building, to be erected at Oceanside, for the First Christain Church. It will cover an area 100 feet square. The building will be constructed of granite, Utah buff sandstone and pressed brick. The roof will be covered with asbestos shingles. The main auditorium will be 50x70 feet in size; the Sunday school room, 32x62 feet. By a special arrangement of doors, these two rooms can be thrown together. The ground floor will contain the lecture and social hall, 50x56 feet, dining room and library, 31x44 feet; large kitchen, pantry, store rooms and heating apparatus. The inside finish and pews will be of oak. The lighting fixtures and stained glass windows will be of special design. The bell tower will be 100 feet high, and contain chimes of eleven bells. There will be two organs installed, one costing about $10,000, and an echo organ in the tower.

Engineer and Draughtsman Wants Position. Young man having had six years' experience as draughtsman and checker with leading steel companies in United States, desires position on the Pacific Coast. Competent to take charge of work on bridges viaducts, water tanks, reservoirs or factories. First class references. Address, G. W. Edwards, 1122 N. 40th. St., West Phila., Pa.

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POSSIBILITIES OF AERIAL NAVIGATION

Much fun is being made, particularly by the cartoonists, of the possibilities presented in aerial navigation; but, with all the chaffing and fun, that is going to be the great thing of the future. Little by little in war and such things is the balloon turned to practical utility. The latest is a suggestion offered by Architect Fitzpatrick, the executive of the International Building Commissioners' Society, that a captive balloon be used as an auxiliary fire-fighting machine in all cities where skyscrapers are in vogue. His scheme is simple enough and yet there is so much that can be done with a balloon in that connection that it is surprising that it has not been thought of before. His idea is to have an aerial engineer fix up some sort of a balloon that could be quickly inflated or kept partially inflated and bring it into play when needed. A captive balloon, rigged with telephone communication and tackle, and if anything can be found in the way of extinguishing grenades, then those too. A sub-chief, high above a fire and untrammeled by projecting buildings and such obstructions, could much better direct the operations below than could a man on the ground. By keeping well out of the direct flame or excessive heat he could handle his tackle so as to raise men or appliances upon adjacent buildings from which they could fight fire, or he could swing escapes to windows or other points just where needed. The suggestion was made in all seriousness, though it was first accepted as but a jest by one who dearly loves a joke, but we can see where such an appliance could be made use of in an hundred ways by a fire department so that its cost and maintenance would be utterly insignificant compared to the advantages accruing from its installation. Not the least of which is the possibility of keeping a careful watch upon an entire city and the ability to spot and properly locate a fire in its incipiency. Some towns maintain a fire watch-tower; what's the matter with a city balloon?

TIMBER SITUATION IS A SERIOUS ONE

Our government scientists tell us that we are producing less than 40,000,000,000 feet of new timber growth per year. Meantime we are using up lumber in buildings and manufacturing, etc., at the rate of 100,000,000,000 feet a year. There are standing now something like 2,000,000,000,000 feet of timber. At the present rate of destruction all our timber will have disappeared by 1942! We certainly have ravaged our forests, one of our most precious of natural resources, in a most brutal and senseless manner. It has been ruthless devastation, in which, among nations, we stand absolutely alone. All the others have taken ample precautions to safeguard their forests. Less than twenty years ago it was the boast of many states that in the confines of each there was timber enough to supply the world for many years, practically inexhaustible tracts. Lumbering was done in so extravagant, ruthless a manner that those very states today, instead of supplying the world, are importing lumber for their own use!

It certainly is time that we work most assiduously in the development of the various systems of construction using clay or cement products so that the drain on our forests may be lessened instead of increased with years. After all, the destruction of the timber and the resultant great increase of its cost has had, among many evil effects, one good one, in the tendency it has created toward better and more permanent construction of incombustible materials. Yet such construction is by no means as widespread as we might believe or have had reasons to hope for, for in the year 1907, 61 per cent of all the building done was of wood. An assurance that we are yet far from being a "fireproof" people!

SAFETY OF THE TALL BUILDINGS

Recent issues of some of the technical and architectural magazines, including the Architect and Engineer of California, contained much space anent the skyscraper. We published an article by Architect Fitzpatrick of Washington, the executive officer of the International Society of Building Commissioners, who expressed the opinion that the alarm of the insurance companies for the safety of these tall buildings is groundless. Indeed, he goes further, and states that particularly the skyscrapers of New York and Chicago are the safest buildings in those cities. He contends that not only are they not a menace but that actually they constitute a bulwark against the progress of fire in the districts in which they are located.

Speaking of the insurance scare Mr. Fitzpatrick says that it has had one good effect "in that people have been made to think on the subject of construction and are wondering what sort of a chance they would have in case of fire in ordinary buildings, since the tall skyscrapers, the best built buildings in the country, have been declared so dangerous. Anything that will make people stop and think a bit about what constitutes correct and incorrect building is of benefit, even though it be a foolish and needless alarm."

He adds the exhortation that tall buildings be built as perfectly as it is known how, with steel frames thoroughly encased in brick or fireproof tile, with stair and elevator wells enclosed so as to make each story a unit, with all external openings well protected with wire glass and as little wood used in interior decoration as possible (in fact a building is better off without any), and then local water supplies introduced, ample fire-extinguishing apparatus and the employes well fire-disciplined. Skyscrapers built and handled that way may be erected ad infinitum and the more of them there are the safer the cities will be.

LIGHTING AND HEATING

As Applied to Buildings

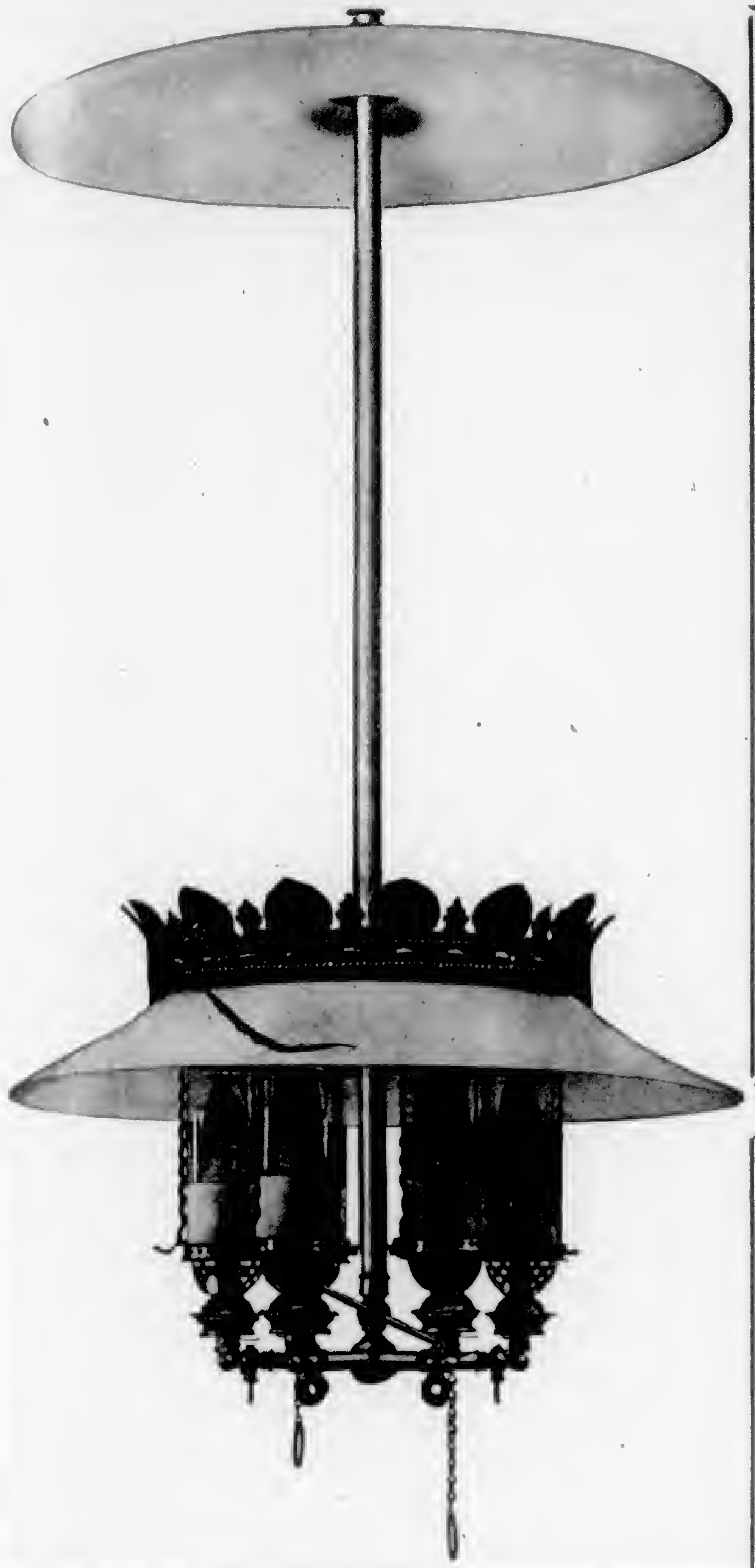
Indoor Gas Arc Lamp.

By T. J. Litle, Jr. *

GAS ARC LAMPS have been developed to fulfill a demand for a lighting unit of greater power than that supplied by the individual Welsbach burners, and the rapid strides in the growth of this form of lighting appliance have brought it to a position of prime importance in the field of practical illumination. The successful development of the modern gas arc lamp to meet all the requirements imposed by maintaining companies and users, and to fulfill the conditions imposed by illuminating engineers, has passed through various stages, and a brief review of the early forms and their basic features will be of interest.

The first attempts at producing a high candle power unit were made in the form of a cluster of individual burners, with separate gas cocks and chimneys, gathered under a common reflector. These appliances were made in enormous quantities, principally in four- and six-light fixtures. While these clusters showed the normal efficiency of the individual Welsbach burner, their ultimate failure was largely due to the high cost of maintenance and the fact that the source of light was not concentrated. The separate burners with glass chimneys and complicated construction could not be made to meet the requirements of a simple and artistic lighting device.

The next step in the development was the introduction of a cluster of burners controlled by a single gas cock and surrounded by a round glass globe to replace the individual chimneys. This design of lamp was called a Gas Arc Lamp, and it met with fair success on account of its simplicity of construction and easy maintenance. Due consideration had not been given, however, to the question of efficiency in gas consumption, and as soon as it was realized that this lamp was grossly inefficient, experiments were undertaken to develop a more satisfactory appliance to meet these conditions.



Early Cluster Lamp

Innumerable designs of arc lamps appeared about this time, but the greater number have since become obsolete. Some which have met with more or less success

*Mr. Litle is Illuminating Engineer for the Welsbach Company. Only the salient points of Mr. Litle's article are reprinted here.

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might be mentioned on account of novel principles introduced. A lamp is being made with a single large bunsen tube and mixing chamber surmounted by a cap containing a number of flame outlets to fit the standard sized mantles. The flames are regulated collectively by a single needle check in the bunsen base, and the mantles are suspended on hooks attached to the center feed pipe.

Another lamp was introduced about this time with a single abnormally large bunsen burner and mantle. It required a mantle several times the standard size, and it was found that the cost of maintenance was enormously increased on account of the extreme delicacy and the high initial cost of these mantles. Furthermore, when the single mantle became damaged or broken the lamp was entirely out of commission.

Modern Gas Arc Lamps

On the basis of the experience received in the development and the failure of the earlier designs of cluster lamps, and on the constructive suggestions obtained from practical gas men and illuminating experts, it was appreciated that a satisfactory gas arc lamp must embody these basic features:

First: Concentration of the source of light.

Second: High efficiency.

Third: Minimum cost of maintenance.

Fourth: Individual adjustment for each burner.

Fifth: Night light.

Sixth: Sure and effective pilot lighting devices.

The problem of producing a concentrated unit of light was met by constructing a cock body which would form the nucleus of the lamp, and from which arms would radiate at right angles for carrying the burners. These arms were made short in order to bring the burners as near as feasible to a common center, thus giving the effect of a concentrated source of light.

The cock body is designed to carry all of the attachments going to make up the cluster body of the lamp, such as bunsen arms, pilot body, globe holder, center feed pipe, clean-out devices, gas ports for the night light, pilot and cluster. It is made from cold drawn brass rod milled and machined in jigs, thereby making it and all of its parts uniform and interchangeable.

The cock plug is made large in diameter in order to give the various gas ways the maximum amount of seal, and is given an extra degree of taper to obviate any possibility of sticking. As an additional safeguard the cock plug is held snugly in position by a compensating spring, the function of which is to take care of variations due to expansion and contraction under the influence of the heat of the lamp and, furthermore, compensate for any wear in service. While this spring keeps the plug seated it does not permit binding. In other designs of arc lamps the practice has been to ignore the necessity of compensating spring to take care of changes in temperature and wear by seating the cock plug loosely, which results after a short period of service in a noticeable gas leakage.

A unique feature in the construction of this part of the lamp is that the cock lever is mounted on the small end of the cock plug and is held in position by a square head slotted screw, which may be removed either with a screw driver, pliers or wrench. The mounting of the lever in this manner facilitates the work of the fitter when it is necessary to grease or clean the cock body or plug. The lever may be readily removed and the plug pushed out between the bunsen arms on the opposite side of the lamp without disturbing in any way any other portion of the mechanism. In all competing designs of arc lamps this very important maintenance operation cannot be accomplished without more or less completely dissembling the lamp.

This lamp is provided with a very simple pilot lighting device, which is adjustable by an independent needle valve. The pilot gets its normal gas supply from the center feed pipe above the main cock. When the chain is pulled to light the lamp, an auxiliary gas supply is turned into the pilot, thereby producing the flash. The ports in the cock body are so arranged that two separate flashes are produced—one for lighting the night light and the other for lighting the remainder of the burners. This auxiliary gas supply when turned into the pilot causes the flame to be projected up into the cluster of mantles and insures their lighting.

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The importance of the night light feature in cluster lighting arises from the fact that many consumers, desiring a small amount of light for all-night illumination, turn the light down by partly closing off the burner cock. This practice leads to rapid deterioration of mantles, possible carbonization and shrinkage, and in a good many cases to flash-backs, which result in destruction of the burner caps and clogging the bunsen tubes. To meet this condition the Welsbach people have designed their burner cock in such a way that the lever has a neutral position, in which one burner is given its normal gas supply while the other burners are entirely cut off. The night light is turned on by the simple act of pulling down on the middle one of the three chain rings.

The principal contributing factor in the rejection of the early designs of arc lamps was the failure on the part of designers and builders to consider the importance of cost of maintenance. No matter how perfect in design and construction, the features which contribute to economy in maintenance must be given a position of importance or the lamp will be ignored by companies engaged in the installation and care of these lights. Scientific construction and artistic design of fixtures pass for naught when it comes to gas ways clogged with dirt, and the importance of accessible clean-out devices cannot be overestimated.

Clean-out screws have been placed in such positions as to render every gas port in this lamp accessible, and any gas way or check in the lamp can be thoroughly cleaned by removing a screw and swabbing out without disturbing any other portion of the lamp.

The first great step in the improvement of the efficiency of the gas arc lamp over the older types was the introduction of a

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draught inducer or stack. Scientific tests show that the introduction of this device increased the efficiency of these lamps from 25 to 40 per cent. A strong argument in favor of the importance of this feature is the fact that it has been almost universally copied by competitors.

The stack is designed to fill the dual role of, first, draught inducer for the purpose of perfecting the combustion and increasing the efficiency; and second, as a protector for the mantles during the various maintenance operations.

The next important improvement in the gas arc lamp was made by the elimination of all glassware except the globe. Many original designs of arc lamps had a glass ceiling shield and a glass reflecting shade besides the globe, all of which had to be cleaned and renewed, adding materially to the cost of maintenance. The problem of meeting this glassware condition was taken up in the same manner as were the other vital points connected with the development of the gas arc lamp, with the result that engineers were able to design a single piece of glassware which fulfills the function of both globe and reflecting shade.

A scientifically designed pear-shaped globe made from alabaster glass was the result of this experimental investigation, and the most careful photometric tests prove that it fulfills the requirements of efficient illumination, and, in addition to this, it has the commendable feature of artistic appearance.

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Dinner of Electrical Engineers

The annual dinner of the American Institute of Electrical Engineers was held at the Waldorf-Astoria Hotel in New York on February 19th. Following the custom of previous years, this dinner was of special significance. The Library Dinner was given in 1903, in 1904 the Edison Dinner commemorated the introduction and development of the incandescent lamp, and the Traction Dinner was given in 1905. This occasion was known as the Public Service Dinner.

There is no question more deeply affecting the public welfare at the present moment than the relation between the community and the public utility corporations, that furnish it with the great modern agencies of light, heat, power, transportation, the telegraph and the telephone. The speakers of the evening treated these momentous issues from broad points of view and with commanding authority.

Advertising is Business Insurance

Have you ever considered an advertising campaign from the standpoint of an insurance policy? You insure against such contingencies as fire, shipping disaster, and dishonest employees, as a matter of course, but the moment someone mentions advertising as a business-builder for your particular benefit, you immediately begin to "hedge" and vow that you cannot afford such an expensive luxury, etc., etc.

Have you ever thought that the greatest of all commercial calamities—loss of trade—can be insured against?

The "premium" represented by the cost of advertising is, in proportion to the importance of the security afforded, no higher than other insurances; in fact, it is considerably smaller and soon becomes a minus quantity. Any other kind of insurance is an expense; worse than that—it is a dead loss so long as there is no "claim."

But the insurance of trade, represented by advertising carries a direct profit with it. It covers not only the risk of losing trade, but also the minor risk of being compelled by competition to carry on business at a diminished profit.

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that, instead of being regarded as an investment of capital, as they ought logically to be, they are almost invariably written off, year by year, as a current expense.

A considerable proportion of such "premiums" could properly be treated as invested capital, since the good will and assured maintenance of demand are a tangible and salable asset.

Think it over—you who have been accustomed to regard advertising as so much blue sky and hot air. It's a thoroughly practicable business proposition and should be considered in no other light. Keep up your advertising "premiums" and you will not have to "die to win."—From Everybody's.

A Real Milker

A Stroud farmer on route 1 has taken out a patent on an electric motor fastened on a cow's back, the electricity being generated by a dynamo attached to the cow's tail, says the Stroud inventor. It strains the milk and hangs up the pail and strainer; a small phonograph accompanies the outfit, which yells "So!" when the cow moves; if she kicks, a hinged arm catches the milk stool and lams her over the head with it..—Lincoln County (Okla.) Journal.

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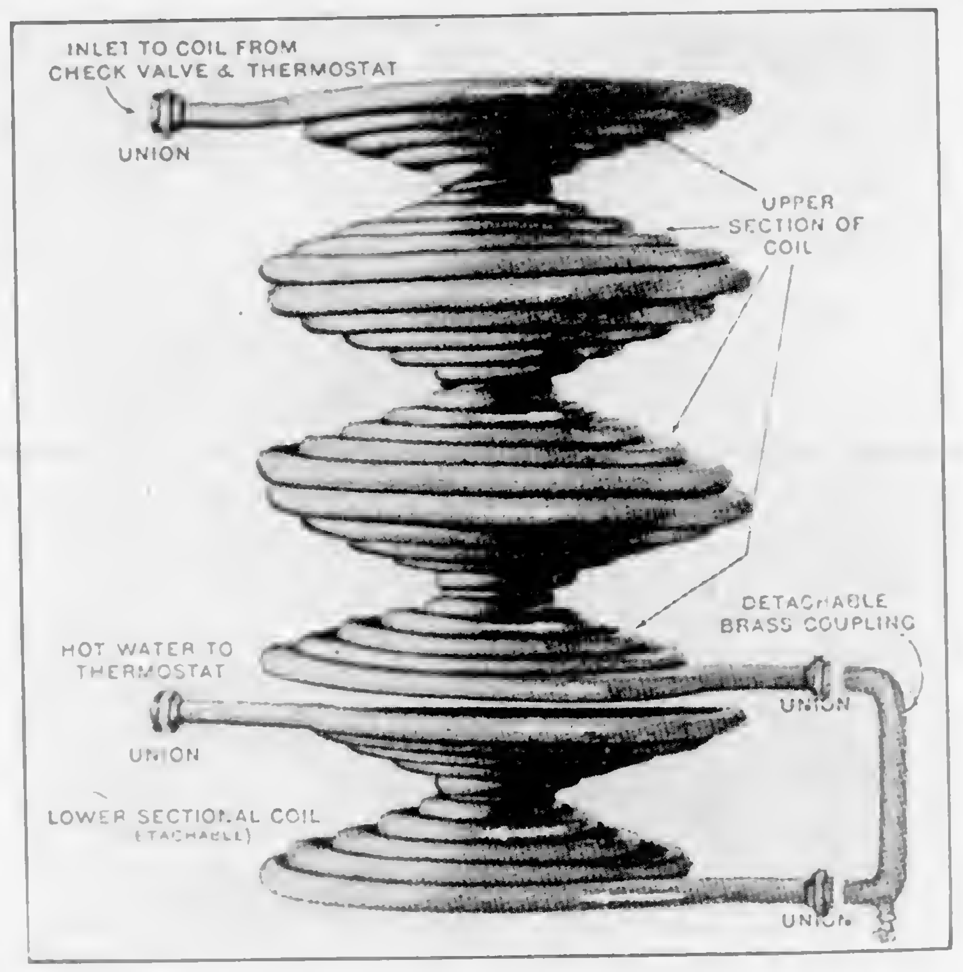
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The Engineering Digest

A more or less general misapprehension by technical readers as to the nature of the contents of "Technical Literature," as described by that title, has made a change of name advisable. The magazine is an engineering publication—an epitome or compendium of published information on technical subjects—it deals with the subjects of current interest, not merely with the literature of these subjects, as might be erroneously assumed from the words "technical literature." A magazine of this kind is essentially an "Engineering Digest" and after careful consideration this title has been adopted as most clearly defining the nature of the publication.

One of the handsomest volumes that has come to us is from the well-known publisher and importer of architectural and art industrial books, Paul Wenzel. It is called "Flats, Urban Houses and Cottages," and is a comprehensive volume to "The British Home of Today." The text is by Frank T. Verity, Edwin T. Hall, Gerald C. Horsley and W. Shaw Sparrow. The book is profusely illustrated with half tones, line cuts and beautiful color plates. The text is replete with valuable information for architects and builders, the subjects being arranged in three chapters, the first, under the caption, "A Flat Dweller's Point of View;" the second, "Flats, British and Foreign," and chapter third, "Urban Houses and Cottage Homes." There are one hundred and sixty-two pages. A. C. Armstrong & Son, New York.

Another book of interest is "Building Superintendence," by Edward Nichols—an especially useful volume for architects, owners, contractors and all interested in building operations and trades. For purposes of ready reference and timely information—accessible, concise and understandable—these books will be found to meet every requirement. American School of Correspondence, Chicago, Ill.

Death of Llewellyn Tozer

Llewellyn Tozer, senior member of the firm of L. Tozer & Son, interior decorators, was run down by a streetcar Monday, March 23 and died the following Thursday in St. Luke's hospital, where he had undergone an operation in which both feet were amputated. Tozer was 63 years old and the shock was too much for him to survive. The funeral was held Sunday afternoon at 2 o'clock at N. Gray's chapel under the auspices of George H. Thomas post G. A. R. of which he was a member.

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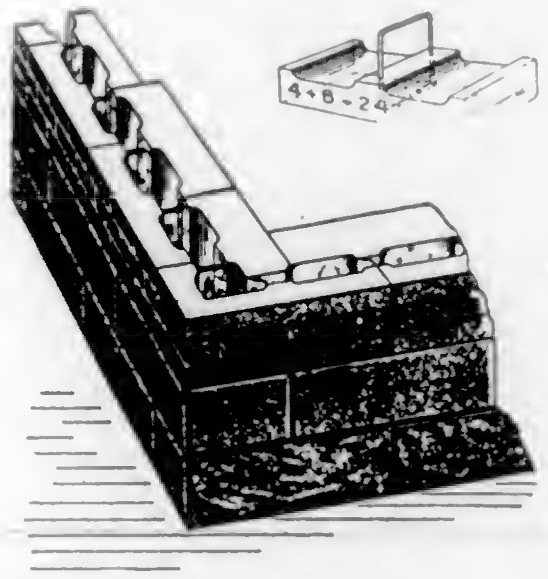
By the Way

Some Industrial Information Worth the While

The "Nodamp" Two Piece Wall.

The Nodamp Machine Company, 415 Andries building, Minneapolis, Minn., having acquired the United States patents on the Ames "Nodamp" concrete block machine, also the patents for the "Nodamp" block and wall, have opened offices at the above address. Great superiority is claimed for the "Nodamp" two-piece wall, as it gives a continuous vertical and horizontal air space throughout, which, it is said, makes it absolutely moisture and frost proof. This system has no concrete webs or overlapping blocks to conduct moisture and frost to the inner surface, making it possible to safely plaster directly on the wall, thus saving the expense of furring, the lathing and one or two coats of plastering. The outer and inner walls are laid up in separate pieces firmly bound together by indestructible metal bonds inserted in each block when made. This gives a block easily laid in the wall by one man, thus possessing advantage over heavy blocks made in one piece requiring two men to handle them.



The "Nodamp" block machine produces blocks from two to eight inches thick, thus making it possible to build a wall of any desired thickness. The outside block may be made of greater proportion of cement and fine sand and the inside block may be made of coarse sand, gravel and cobble or broken stone, any size that will go in the mold. One machine is sufficient for all kinds of blocks, being quickly changed from one style or thickness to another. The joints of inner and outer wall are always broken, a most desirable feature.

The "Nodamp" block machine is well and carefully made and practically indestructible. No iron pallet required, simply wooden pallets made on the ground are all that is necessary. Blocks are made with great rapidity and delivered at a convenient height to be reached and carried away by one man, while another block is being made. No cores, no jarring or pounding; hence no broken or cracked blocks with the "Nodamp" system.

The block, the wall and the machine are fully covered by United States patents, giving protection to all purchasers of machines and owners of buildings constructed under this system. Catalogue "G" covers the entire process of block making, and will be sent by the company to anyone for the asking. Agents wanted in California, Oregon, Washington. Write without delay.

The Sing Fat Store.

China has an emblematic beast, a great black dragon which scrambles all over the center of its bright yellow banner and typifies the huge nation for which it stands. Wherever there are Chinese there are dragon ensigns. Naturally they should be displayed locally now, for Chinatown in San Francisco is back where it was two years ago, and while it now wears a cleaner face, it is not the less interesting place. Architecturally it is the more interesting, for where previously the rigid lines of cheap occidental building construction had provided perpendicular walls, now the fantasy of the Far East has been borrowed by the architects and in the Chinatown of today the pagoda style is the sign of progressiveness.

The Chinese dragon of the Sing Fat company, Inc., the oldest Chinese store in San Francisco, has now climbed to the top of the pagoda building at the southwest corner of California and Dupont streets.

For Chinese shopping one does not go to China—one goes to the Sing Fat company's stores. There is to be found a better assortment of oriental goods than China ever had collected under a single roof. And there the American finds that he is treated with more courtesy than he is apt to expect from American shop keepers and with the same honesty and regard for his custom. There—at Sing Fat's—he always has the alternative that is practiced by the most reputable of western merchants, of receiving his money back for goods which he later finds he does not want.

Before the fire Sing Fat was established in Dupont street adjoining St. Mary's church. The store had been a rendezvous for tourists since the days of 1866, when it was first established. Like nearly everything else in California in those days, the Sing Fat company was the pioneer in its line. It originated the idea of Chinese selling Chinese goods in a Chinese way, with American improvements. After the fire the company opened a store at 1121 Post street near Van Ness avenue, which place will be continued as a branch of the four-story main shop. Another branch exists at 548-550 South Broadway, Los Angeles. And in Canton, Shanghai, Hongkong and Yokohama and Kobe there are factories operated by this company, which devote all their time and skill and cunning to the manufacture of rare and delicate articles of Chinese and Japanese design for the American consumer.

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Want Home Industry for Steel and Iron

Home industry for structural iron and steel will receive a big impetus in the near future, if action taken at a recent conference held in San Francisco between union delegates and a committee from the architectural iron builders' branch of the California metal trades association proves as fruitful as expected.

By the decision reached after several hours of spirited discussion members of the local housesmiths', structural iron workers' and erecters' unions will undertake to see that all structural iron and steel used in the city shall bear a union label. As most of the Eastern material shipped here is made by non-union workmen, it is believed this step will go far toward solving the problem. The union men may also refuse to work on buildings where Eastern non-union material is used.

Since the fire local manufacturers have been losing through orders for structural building material going to Eastern firms. In practically every instance, it is said, the material could have been supplied in San Francisco for the same money as was paid the outside bidders. The situation has finally become so serious that many local manufacturers will face financial embarrassment if conditions are not remedied.

The meeting was called by the committee from the metal trades association, of which Harry F. Davis is secretary, for the purpose of impressing the union men with the gravity of the situation and of securing their co-operation.

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The Passing of the Shovel.

Catalogue G, of the Ames Cube Mixer, is in our hands, and is very appropriately, entitled "The Passing of the Shovel." The Ames concrete mixer is a machine of low price, intended for use on work where a contractor would otherwise use hand labor. The machine is mounted either on trucks or skids, with or without power, and is very readily moved from one place to another, making it adaptable for work where only small batches are required. It is recommended by many of its users as being equal to the high-priced mixers.

The mixer is made with a large door, which is nearly one-half the size of one side of the cube. This makes it easy to fill and easy to discharge. There is no flange inside the mixer around the door to hinder the concrete from discharging. The opening is perfectly smooth. The door is clamped shut by a patent clamping device which is absolutely impossible to work open when in use. The graduated watering tank is placed at one end of the cube. The water is admitted from the tank into the mixing cube by a stationary pipe from the same, entering one of the journals and running full length of the cube, delivering the water to the mixture from the under side in a spray, while the cube is in motion.

"Medusa"

The Building Material Co., Inc., reports the following recent specifications of its Medusa White Portland Cement:

Interior and exterior plastering of the six-story reinforced concrete Bank of San Jose building, San Jose, Cal.; exterior finish on the Red Bluff Opera House, Red Bluff, Cal.; swimming pool of Atlantic City hotel, New Jersey.

Also the following specifications of its Medusa Water-proof Compound:

U. S. Government constructions at Fort Mason—the greatest piece of concrete waterproofing ever undertaken anywhere; Southern Pacific Ice Plants, Las Vegas, Nevada; Southern Pacific Hospital, San Francisco; U. S. Navy Yard, Puget Sound, Washington; Banca Popolare D'Italiana, San Francisco; Long Syrup Refining Company's building, San Francisco; Butler building, San Francisco; N. W. R. R. Co. construction, San Anselmo, Cal.; Red Bluff Opera House, Red Bluff, Cal.; Merritt Hospital, Oakland, Cal.; Emporium building, San Francisco; Wilkens building, San Francisco; Call building power house, San Francisco; Welch building, San Francisco; U. S. Government Construction, Fort Barry, Cal.; Bureau of American Republics, Washington, D. C.; Gloekler building, Pittsburg, Pa.; Joplin Hotel, Joplin, Mo.; Third National Bank building, St. Louis, Mo.; Oregon Short Line constructions, Salt Lake, Utah; Lynn Haven Hotel, Norfolk, Va.; Oswego Falls Paper Co., Fulton, New York; Armour & Co. building, Chicago, Ill.; G. & T. Earle Co. constructions, Wilmington, England, and Cleveland Concrete Building Block Co., Cleveland, Ohio, in entire output.

State Building at Seattle

The plans for the California building at the Seattle Exposition in 1909 are being drawn by State Architect Sellon, and will soon be finished. It is proposed to have everything in readiness to begin construction by the middle of next month. The structure will be under the supervision of the state engineering department.

PHOTOGRAPH OF WINDOW MADE BY
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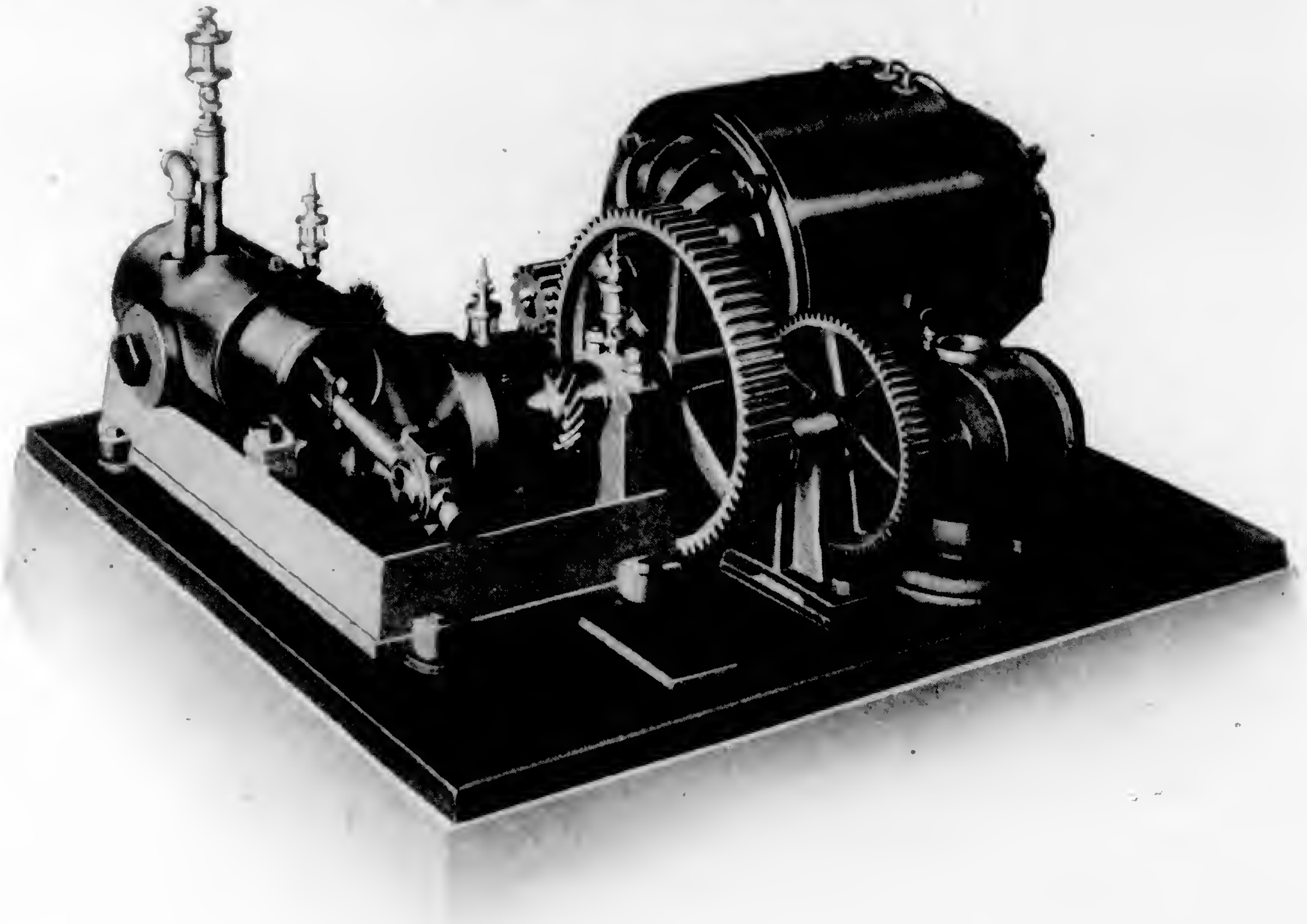

The G. E. Witt Oil Burning Plant

Oil Burning Plant in Mose Gunst Building

The above halftone was taken from the plant installed by the G. E. Witt Company in the Mose Gunst Building, corner of Mission and Third streets, San Francisco, which plant is under guarantee to be entirely automatic and to run eight hours without attention and not to vary more than one-half pound from the desired steam pressure, in order to give perfect combustion.

The plant consists of one double acting air compressor, size 3½x3½; one rotary oil pump, ⅛ horse power, and one 2 horse power motor.

This compressor is built to work on any pressure desired, from one to one hundred pounds, and it has more than ample capacity to do the work required. It is now being run at fifteen pounds air pressure and ten pounds oil pressure.

The apparatus used on this plant is of the highest grade and is equally as good as any oil burning plant installed on steamers burning oil at sea.

Witt burners have been adopted by the United States Government and by such companies as the Southern Pacific Railroad, the Santa Fe, the California Northwestern Railway, the California Fruit Canners Association, the California Wine Association, and are handled by Messrs. Henshaw, Bulkley Co., Baker & Hamilton, and many of the larger hardware and machinery houses in San Francisco.

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Leases Additional Land—Stock Increased

The Interlocking Stone Company of Oakland has singularly been little affected by the financial stringency of the money market. Indeed, the company's officers say that business has increased with them and that people are putting their money into buying stock in the company in preference to depositing it in the bank.

At a special meeting of the company, held recently, enthusiastic reports were received from Oregon and Washington, where royalties were sold for 5 cents per block with $25,000 as advance royalty. As a consequence of the great demand for the interlocking stone machines, it was decided to increase the price of stock to $20 per share. The whole corner at Ninth and Clay streets, Oakland, has been leased, and the plant enlarged, Oakland and California thereby deriving especial benefit from this remarkable industry.

"The proper investment of money is always a question prevalent among the more ambitious people," said President F. V. Schiller. "How to invest their money so that the principal will be absolutely safe and the returns large enough to warrant the investment is the problem. A few dollars properly invested is certain to bring a golden reward. Many fortunes have been made by the investment of a small amount of money; more fortunes and greater fortunes are still to be made. The chances for the careful investor to acquire great wealth have never been greater than the present time. If you would strike while the iron is hot, call on the Interlocking Stone Company. Why should you not grasp this opportunity of bettering your financial condition?"

Great Steel Dome

When the new Emporium building is completed it will have the largest dome in the United States, measuring 100 feet in diameter at its base. The next largest dome in the country is that on the capitol at Washington, the diameter of which at the base measures 95 feet. James Stewart & Co., constructing engineers of the Emporium building, have completed the false work preparatory to the erection of the massive dome. Two large derricks are now on the roof of the building, waiting for the structural steel.

An interesting feature of this big dome is the fact that it has been erected at the factory of Levering & Garrigues, at Plainfield, N. J., where the different parts have been accurately fitted together. This means the saving of much time when the structural steel arrives here. The Stewart company says it will require only two weeks at the most to complete the construction of the dome, whereas at the factory it has required two months to erect it temporarily and fit the hundreds of parts accurately.

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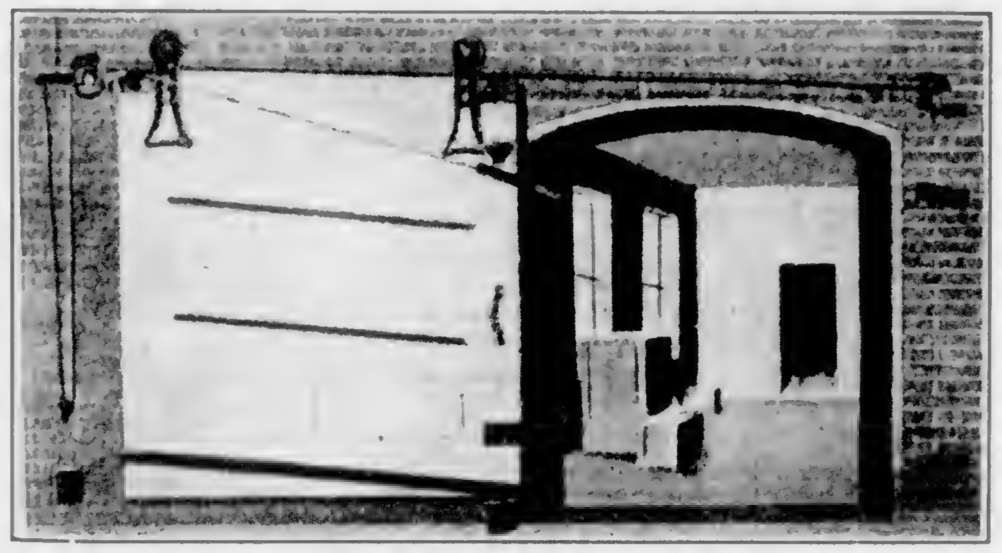

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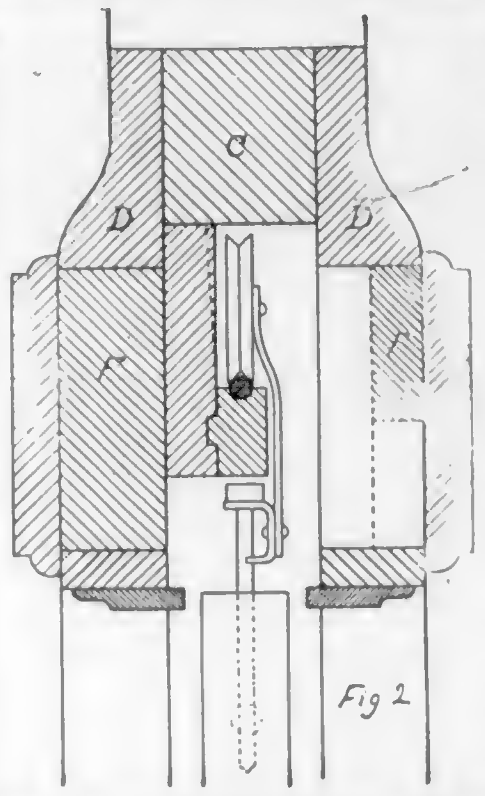

Fig 2

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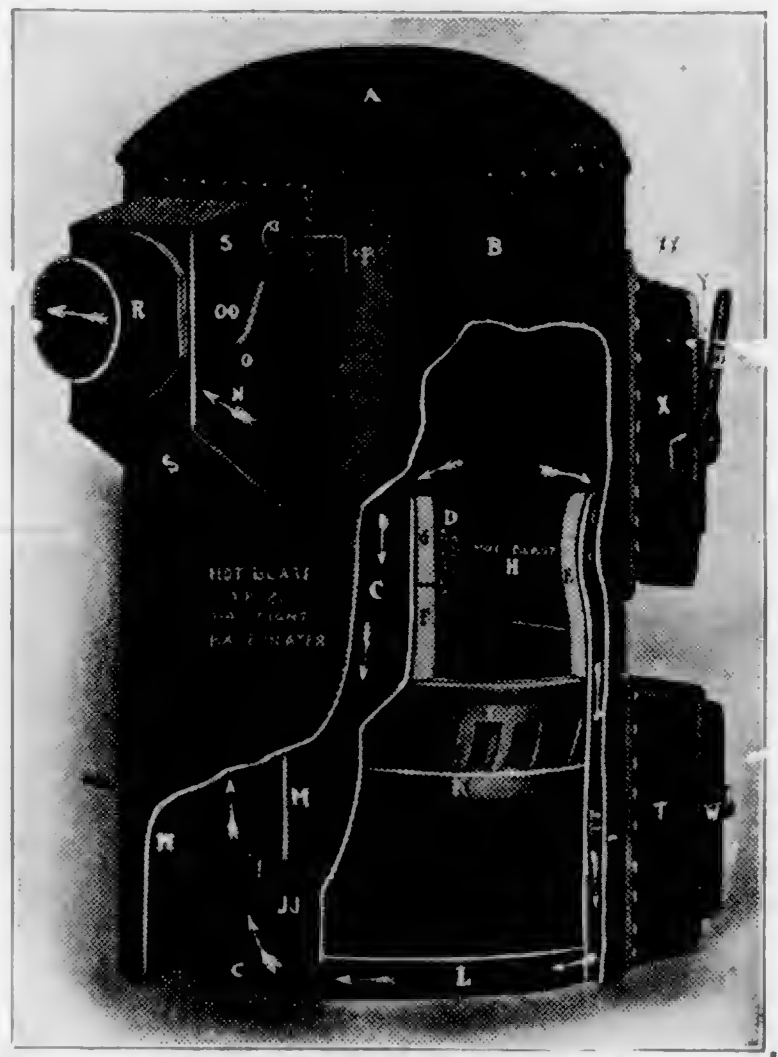

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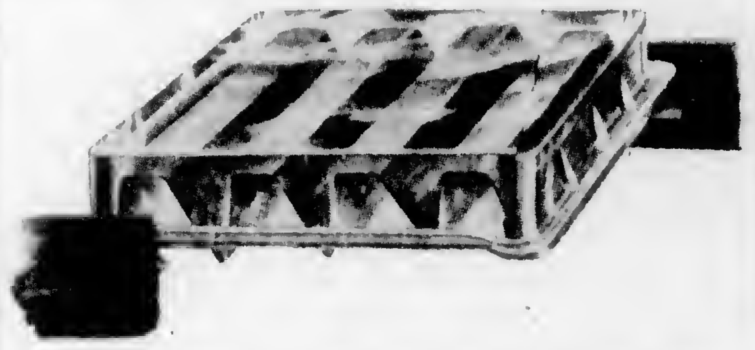

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A Fine Catalogue

The new catalogue of the Jas. G. Wilson Manufacturing Company of New York has just been received by the Architect and Engineer of California. It is the most complete catalogue we have seen covering this class of special construction. The first portion of the book is devoted to photographs and illustrations showing various installations of steel, wood and bronze rolling doors. Unique among these is a recent photograph of some Wilson doors that have been used daily for twenty-nine years. The latter portion is taken up with details and contains many valuable hints for engineers, architects, and owners of buildings.

The James G. Wilson Manufacturing Company is one of the oldest and most conservative manufacturing concerns in the country and devotes its attention almost exclusively to the better class of buildings, where absolute perfection of mechanical details is insisted upon. They are the originators of many devices in general use in connection with steel rolling doors.

One of the recent installations of Wilson steel rolling doors is that just completed for freight sheds of the Northern Pacific Railway at Portland, Oregon, being the largest single contract for steel rolling doors ever placed in the United States. The Wilson doors vary in construction from freight shed doors to highly finished bronze doors for use in office buildings, banks, etc.

A very important portion of the Wilson factory is devoted to special school and church construction. Rolling partitions are made of fine woods to match interior finish of buildings and by their use cumbersome folding or sliding doors are done away with. Many of the principal churches and schools in California are making use of these partitions.

Announcement

The architectural profession and the public in general will be interested to learn of the retirement from the profession of the well-known architect, Mr. H. G. Corwin. Mr. Corwin has designed many buildings in San Francisco and adjoining counties; among which is the Alcazar theater in San Francisco and the Court House at Crescent City, Cal.

Mr. Corwin has associated himself with Contractor R. W. Fitzpatrick, formerly of the firm of Fitzpatrick & Son, and they will hereafter conduct a general contracting business, with offices in the Lick building.

They anticipate a bright future for the building industries of San Francisco and expect to be among the foremost to assist it in its growth and prosperity.

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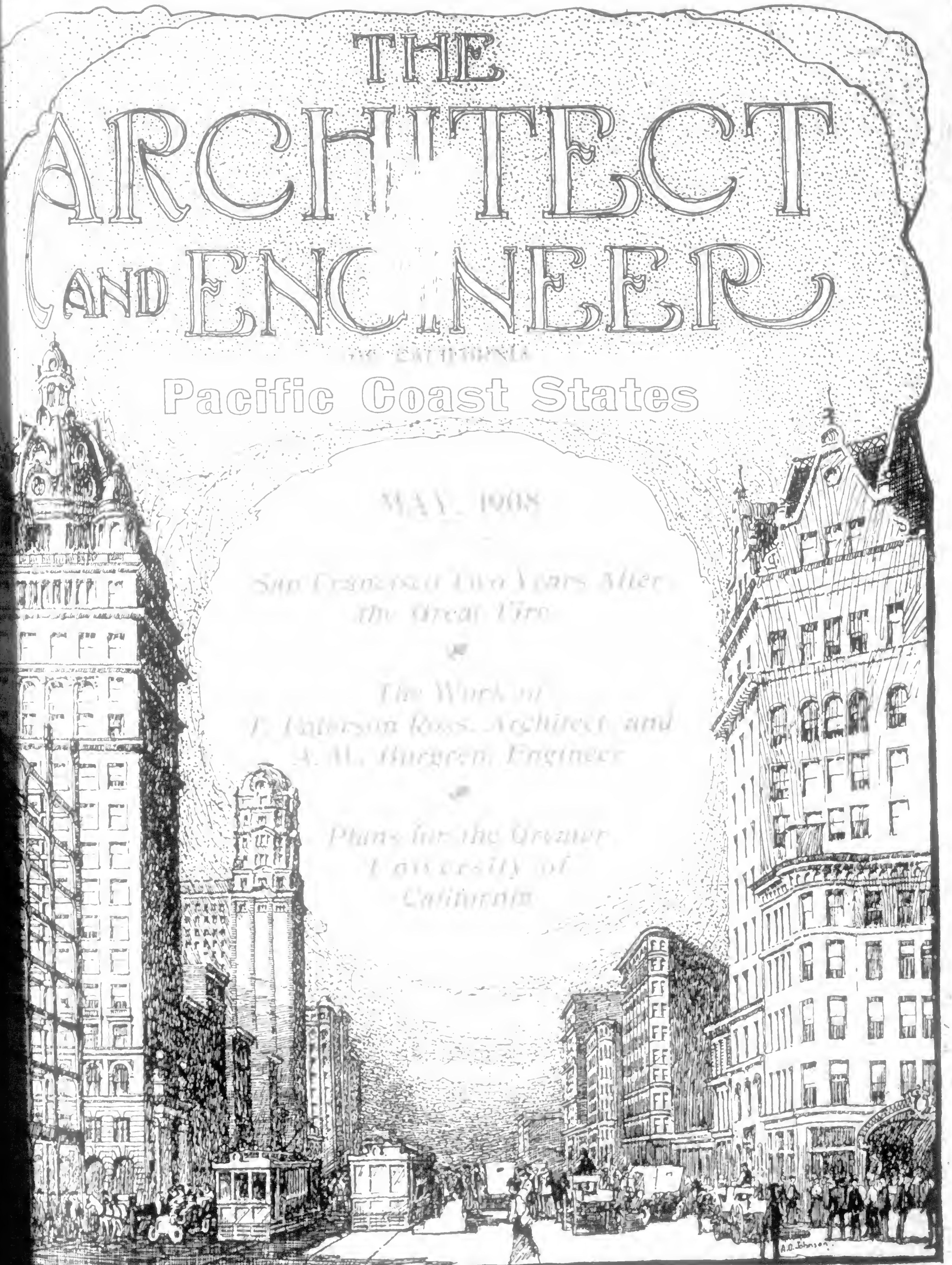

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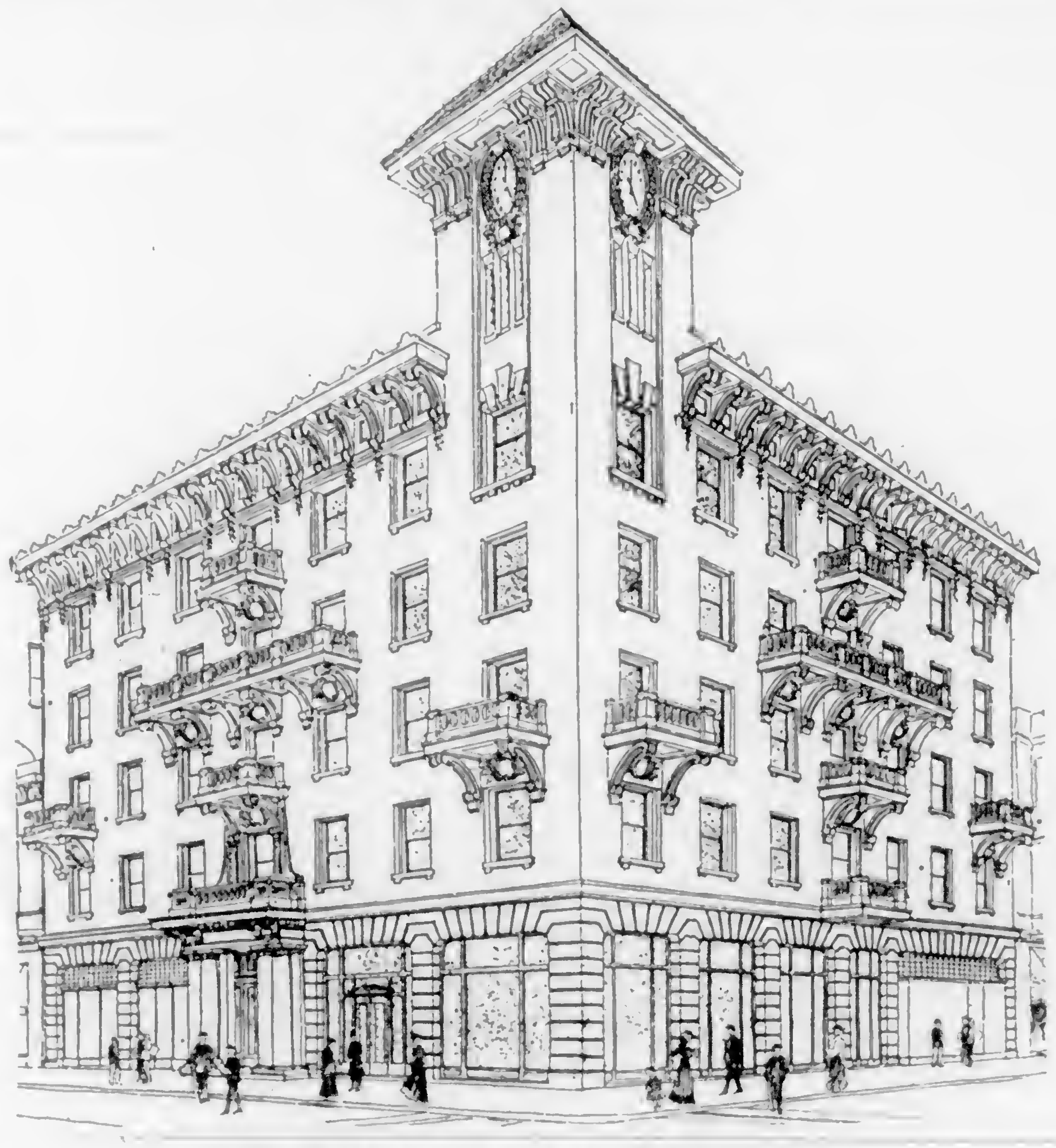

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  Merle Ornamental Iron & Bronze Co., Bay and Stockton Sts., S. F.
  Joshua Hendy Iron Works, **75 Fremont St., S. F.**
  Pacific Rolling Mills, 17th and Mississippi Sts., S. F.
  Pacific Iron Works............Portland, Or.
  Northwest Bridge Works......Portland, Or.

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  California Scagliola Co., 68-70 Clara St., S. F.
  Interlocking Stone Co.. 563 9th St., Oakland
  Hudson Patent Block Co., 302 Builders' Exchange, S. F.
  Asbestolith, A. Willkomm, Agt.............. 779 Market St., S. F.

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  Johns-Manville Company, 180 Second St., S. F.
  Asbestos-Cement Lumber, A. Willkomm, Agt., 779 Market St., S. F.

AWNINGS
  T. Dahl & Co.......573 Eighth St., Oakland

BANK FIXTURES
  C. F. Weber & Co.......1151 Polk St., S. F.

BELTING, PACKING, ETC.
  Gorham Rubber Co...105 Fremont St., S. F.
  H. N. Cook Belting Co., Fremont and Howard Sts., S. F.
  Goodyear Rubber Co....573 Market St., S. F.

BLACKBOARDS
  Whitaker & Ray Co..141-145 Grove St., S. F.

BLUE PRINTS & DRAWING MATERIALS
  Keuffel & Esser......48-50 Second St., S. F.
  Eugene Dietzen........16-28 First St., S. F.

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  Keystone Boiler Works, Main and Folsom Sts., S. F.

BOLTS, EXPANSION, TOGGLE, ETC.
  Star Expansion Bolt Co......Bayonne, N. J.

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  Los Angeles Pressed Brick Co., 1006 Union Trust Building, Los Angeles
  Carnegie Brick and Pottery Co., Montgomery Building, S. F.
  Gladding, McBean Co., Eddy and Hyde Sts., S. F.
  Steiger Terra Cotta & Pottery Co., 18th and Division Sts., S. F.
  N. Clark & Son..........17 Spear St., S. F.

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  Chr. Deterding .....67 Clementina St., S. F.
  Louis De Rome ....126 Main St., S. F.
  Winslow Bros. ......Monadnock Bldg, S. F.
    Security Bldg., L. A.
  Frauneder Ornamental Iron Works, 950 Franklin St., Oakland
  Western Builders' Supply Co., 680 Mission St., S. F.
  J. G. Braun ....New York
  Merle Ornamental Iron & Bronze Co., Bay and Stockton Sts., S. F.

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  Russell & Erwin Mfg. Co., 933 Monadnock Building, S. F.

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  Richter Mfg. Co., 2 Franklin Ave., Tenafly, N. J.

CAPITALS, MOULDINGS, ETC.
  Western Builders' Supply Co.. 680 Mission St., S. F.

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  McCormick & Henderson..110 Bush St., S. F.

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  Pacific Portland Cement Co., Pacific Bldg., S. F.
  Girvin & Eyre, Merchants Exchange Building, S. F.

CEMENT—Continued.
  W. R. Grace & Co....614 California St., S. F.
  Western Building Material Co., 430 California St., S. F.
  Balfour, Guthrie & Co., 320 Sansome St., S. F.
  The Building Material Co., "White Portland," 587 Monadnock Bldg., S. F.
  Holmes Lime Co., Mutual Savings Bank Bldg., S. F.
  Pacific Builders' Supply Co., 207 Builders' Ex. Bldg., S. F.
  Western Lime & Cement Co., 268 Market St., S. F.

CEMENT BLOCKS
  New Era Company......Pacific Bldg., S. F.

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  D. Ross Clark.....Builders' Exchange, S. F.
  A. Raventos, Hotel Irwin, 108 Fourth St., S. F.

CEMENT TESTS
  E. T. Everett..Beach and Mason Sts., S. F.

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  Pacific Builders' Supply Co., 207 Builders' Ex. Bldg., S. F.

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  International Fabric & Cable, represented by Western Builders' Supply Co., 680 Mission St., S. F.
  Fabricated Structural Steel, sold by Gilhuly & Ambler..........**Atlas Bldg., S. F.**

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    and 842 37th St., Oakland

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  Star Expansion Bolt Co......Bayonne, N. J.

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  Decker Electrical Co...157 Minna St., S. F.
  Hanbridge-Loyst Electric Co., 564 Eddy St., S. F.
  Butte Engineering Co., 884 Folsom St., S. F.
  Drendell Electric Co....................S. F.
  Enterprise Electric Works, 118 Eighth St., S. F.
  Hendy Electrical Co., 63 Fremont St., S. F.
  Steger Electrical Works........Fresno, Cal.
  Comet Electric Co............Portland, Ore.
  Western Electric Works, 61 6th St., Portland, Or.

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  Van Emon Evelator Co., 111 Montgomery St., S. F.
  Otis Elevator Company, Stockton and North Point, S. F.
  Western Elevator Co., 801 Humboldt Bank Bldg., S. F.

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  Leonard, John B........Sheldon Bldg., S. F.
  W. E. Leland..Merchants' Exc. Bldg., S. F.
  Thos. Morrin..........15 Second St., S. F.
  L. Mess & Co., C. E.'s, Merchants' Ex. Bldg., S. F.
  W. A. Stock...............Russ Bldg., S. F.

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  Goodyear Rubber Company, **573-579 Market St., S. F.**

FIREPROOF MATERIALS
  Western Fireproof Material Co., **42 Market St., S. F.**

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- Rulofson Metal Window Works, Monadnock Building, S. F.
- Fred Nichols......1137 E. 16th St., Oakland
- Rapp Kalamein Work, A. Willkomm, Agt. 779 Market St., S. F.

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- Hudson Patent Block Co., Builders' Exchange Bldg., S. F.
- **Demolith Co.... ..310 Clementina St., S. F.**
- **Continental Fireproofing Co., 908 Mutual Bank Building, S. F.**
- **Western Expanded Metal Co., 426 Crocker Bldg., S. F.**
- Roebling Const'n Co...Crocker Bldg., S. F.
- Healy-Tibbitts Co.....Hansford Bldg., S. F.
- Nat'l Fireproong Co., Monadnock Bldg., S. F.

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- **Hardwood Interior Co.,** 873 O'Farrell St., S. F.

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- Gas Furnace Co. ....226 Oak St., S. F.

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- **Laughland & Schuebly Co., 1443 Broadway, Oakland**
- Lange & Bergstrom 138 Investors' Bldg., S. F.
- Long & Hoyt.....Monadnock Building, S. F.
- **Globe Const'n Co......Chronicle Bldg, S. F.**
- Whitney Engineering Co., Hansford Bldg., S. F., and Spokane
- Delmar Smith Co........Kohl Building, S. F.
- **Ransome Concrete Co...Crocker Bldg., S. F.**
- **John C. Ince Company, 406 Sutter St., cor. Stockton, S. F.**

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- Healy-Tibbitts Construction Co., 106-11 Hansford block, S. F.
- **Von der Horst Bros., French Bank Bldg., S. F.**
- T. S. Brown Const'n Co., Pacific Bldg., S. F.

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- Jno. C. Spaulding......787 Market St., S. F.
- Holt, Habenicht & Howlett.269 Fell St., S. F. **and 302 Mason Bldg., L. A.**
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- San Francisco Art **Glass Works, 944 Mission St., S. F.**
- United Glass Co.........115 Turk St., S. F.
- Munich Art Glass Co.....510 Turk St., S. F.

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- Machinery & Electrical Co., **251 N. Main St., L. A.**
- Mangrum & Otter, Inc..507 Mission St., S. F.
- Pacific Blower & Heater Co., **3261 17th St., S. F.**
- Gilley-Schmid Co., Inc., **13th and Mission Sts., S. F.**
- Calif. Hydraulic Engineering and Supply Co..................305 Market St., S. F.

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- Voss, Conrad & Co., Monadnock Bldg., S. F.

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- W. W. Tucker, 14th and Franklin Sts., Oakland

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- Adams & Hollopeter....745 Mission St., S. F.
- Welsbach Co.......351 McAllister St., S. F.

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- Holmes Lime Co...Mutual Bank Bldg, S. F.

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- Western Lime & Cement Co., 268 Market St., S. F.

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- Gage, Mills & Co., Market and Dolores Sts., S. F.
- Pope & Talbott......Foot of Third St., S. F.
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  - Western Builders' Supply Co., 680 Mission St., S. F.
  - Thos. Landy........1673 Market St., S. F.
- ORIENTAL GOODS
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  - Sing Chong Co., 601 Dupont St., cor. California, S. F.
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  - Wadsworth-Howland & Co...............131
- PAINTS, OILS, VARNISHES, ETC.
  - Bass-Heuter Paint Co., 818 Mission, near Fourth St., S. F.
  - **Paraffine Paint Co.,** Merchants Exchange Building, S. F.
  - Toch Bros.' Damp-Resisting Paints, A. Willkomm, Agt., 779 Market St., S. F.
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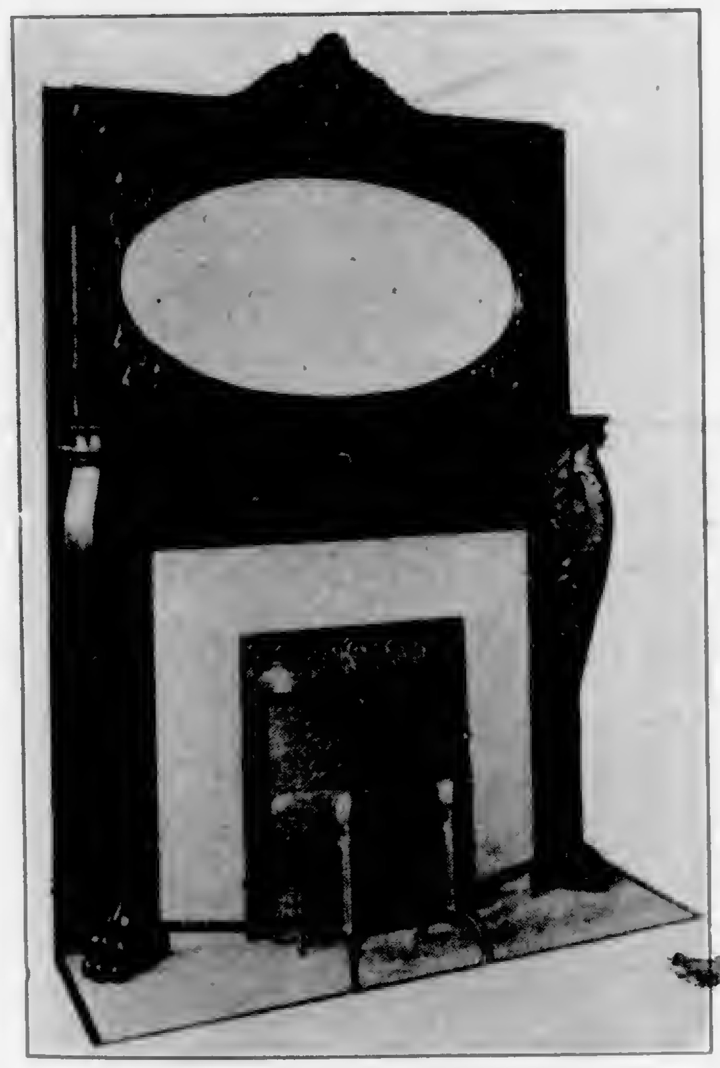

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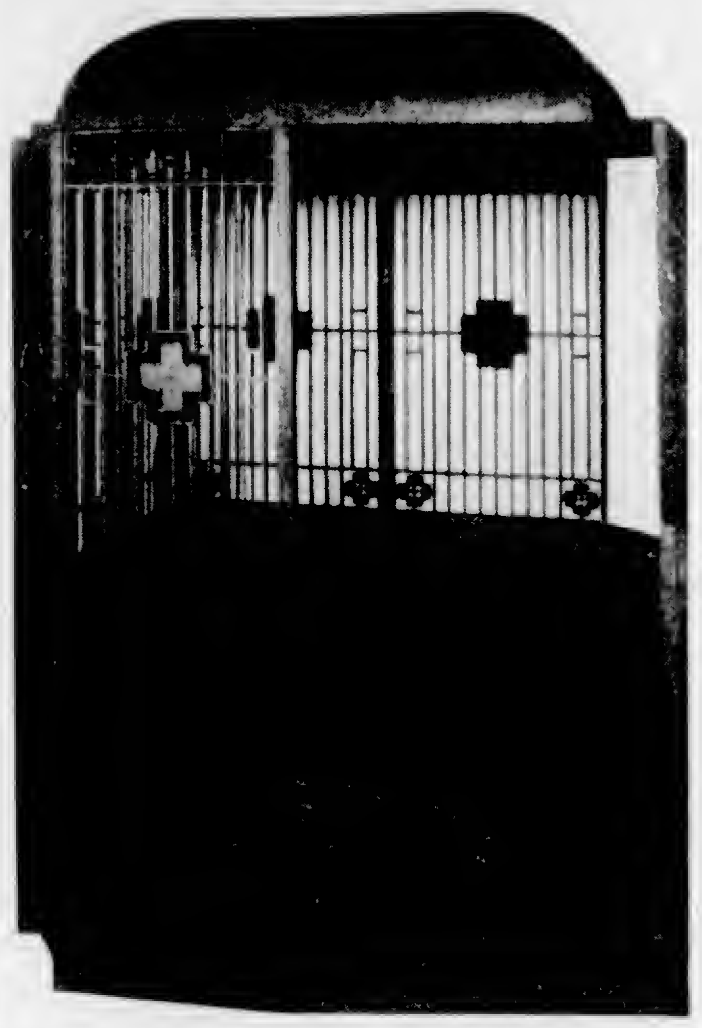

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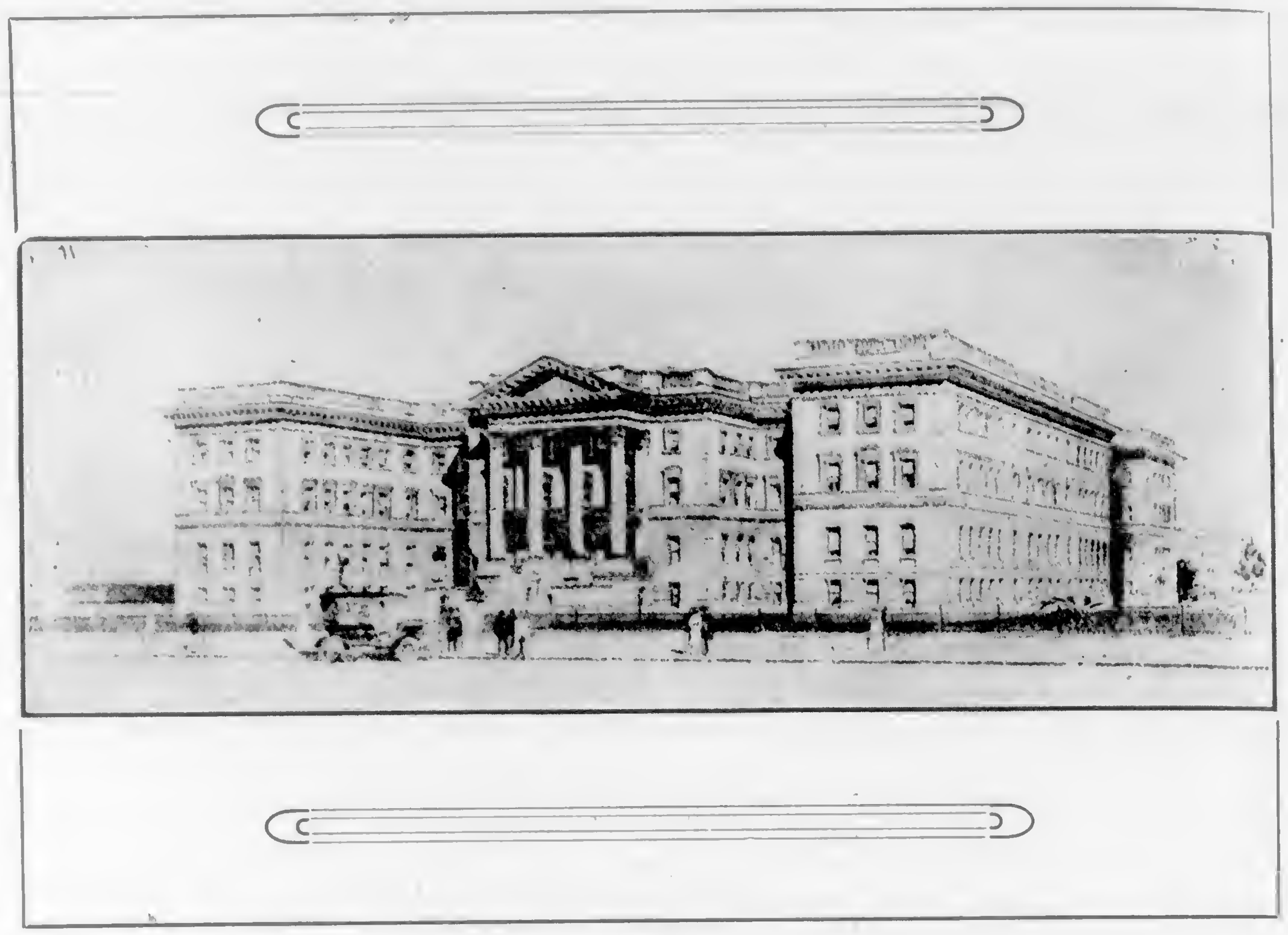

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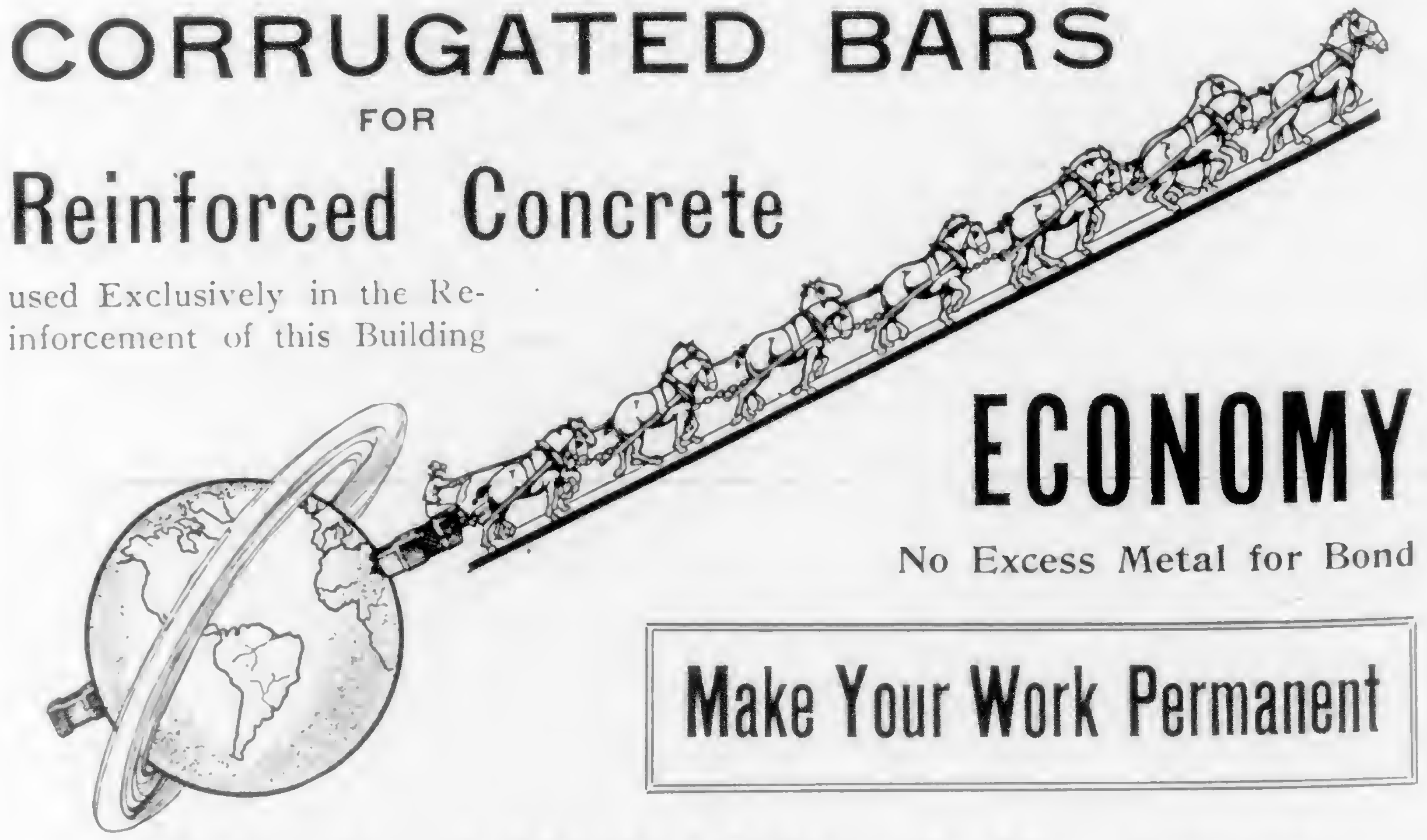

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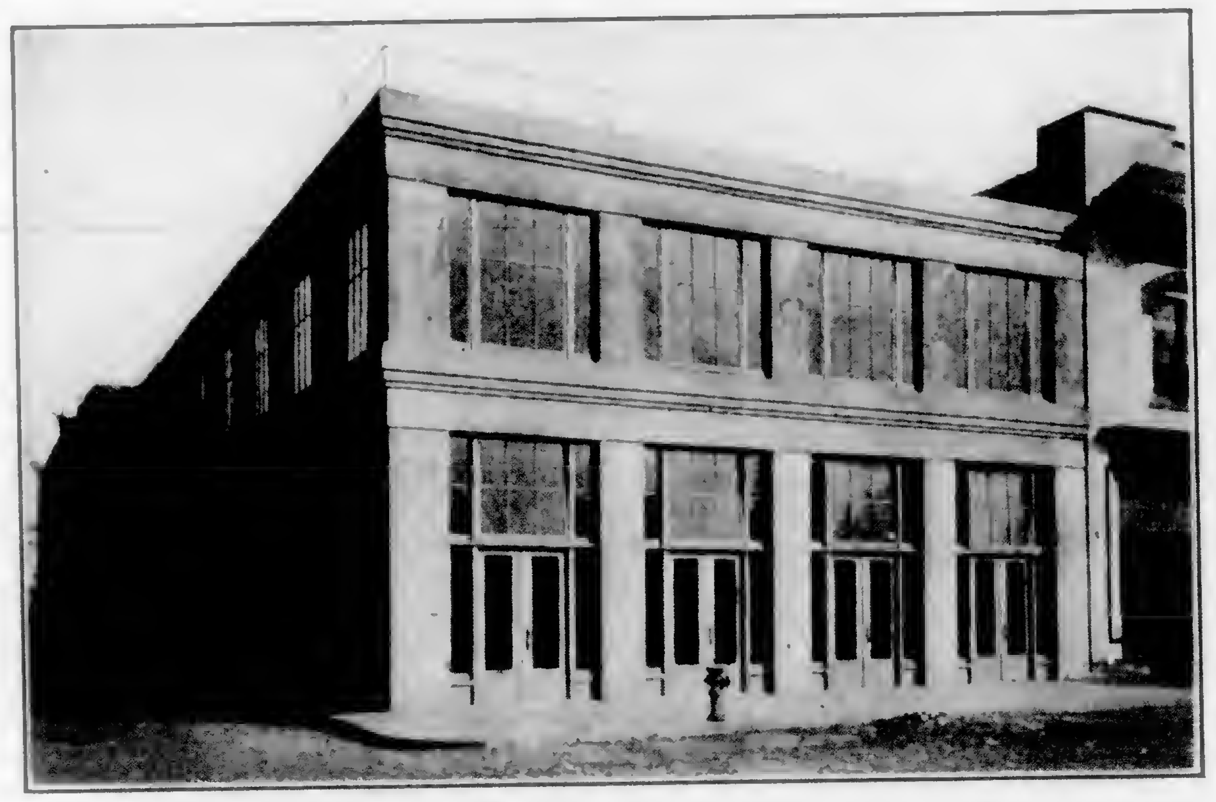

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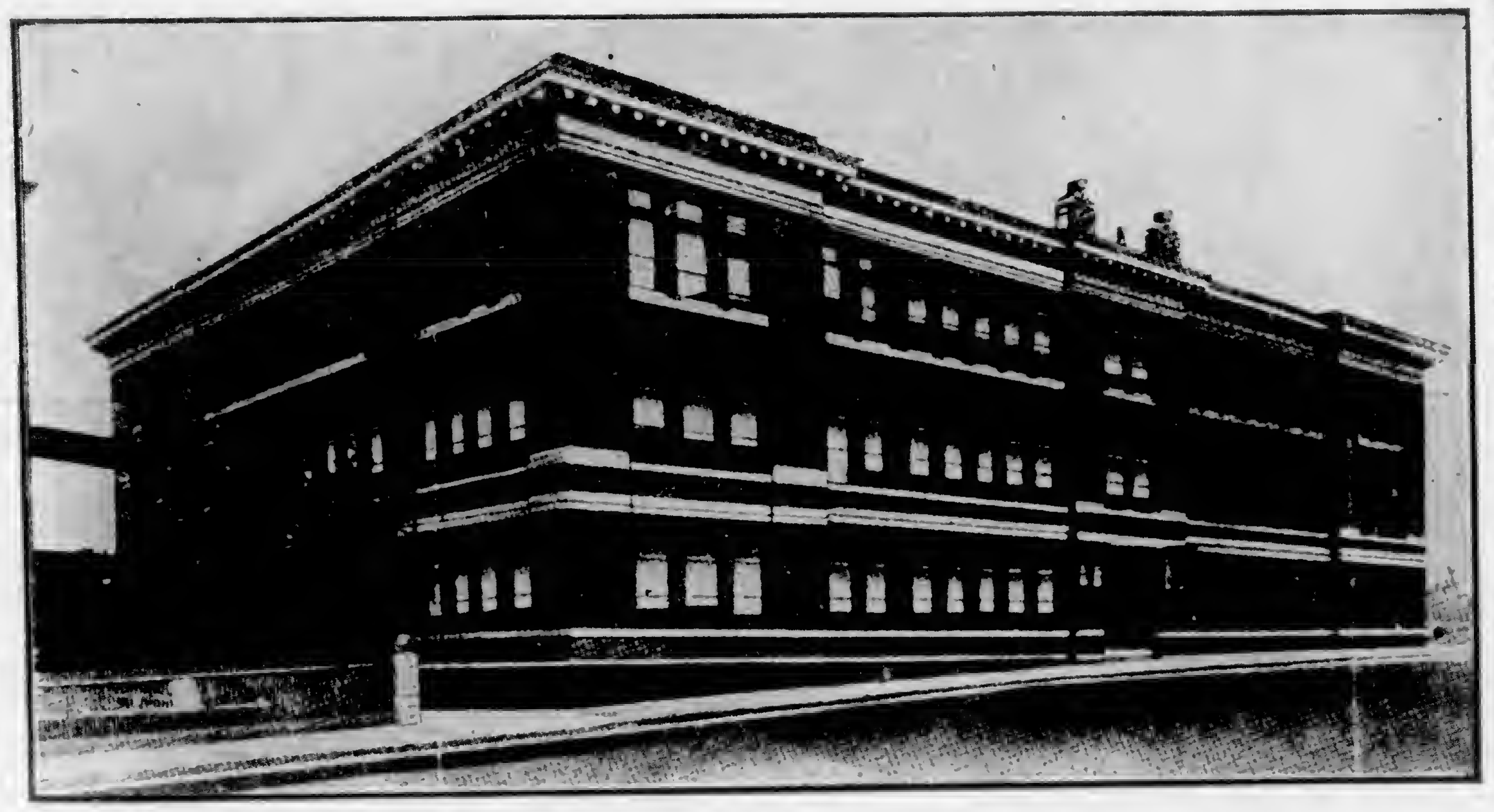

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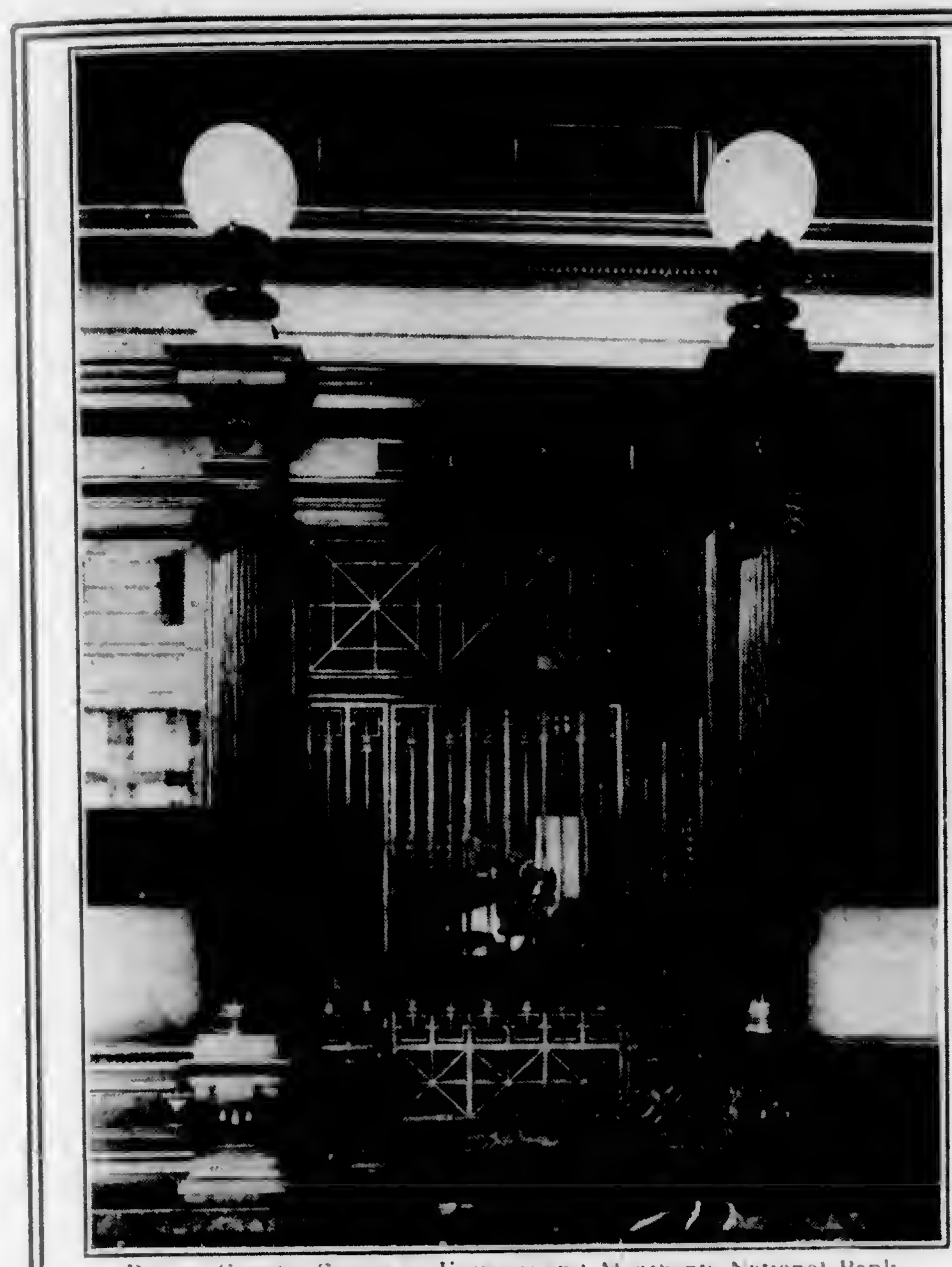

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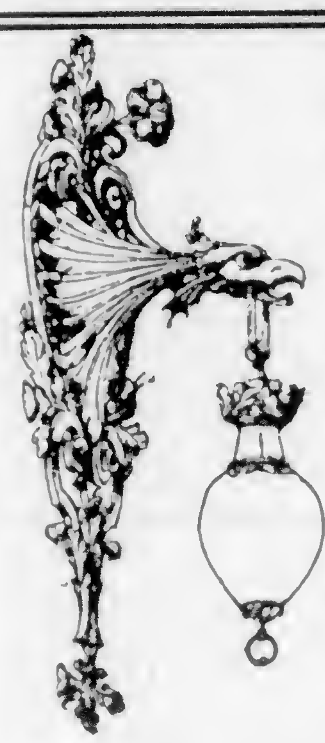

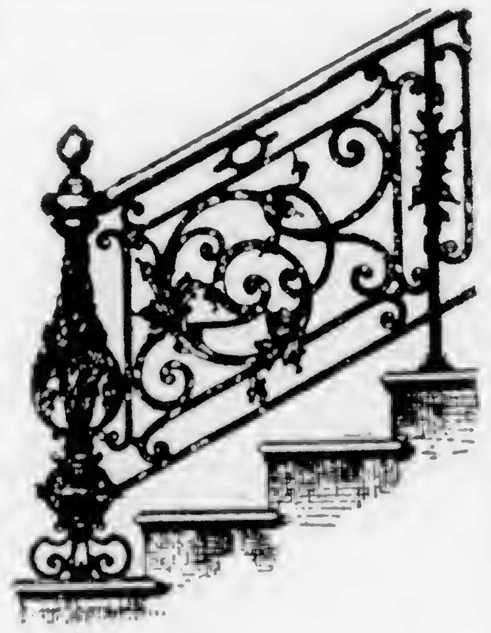

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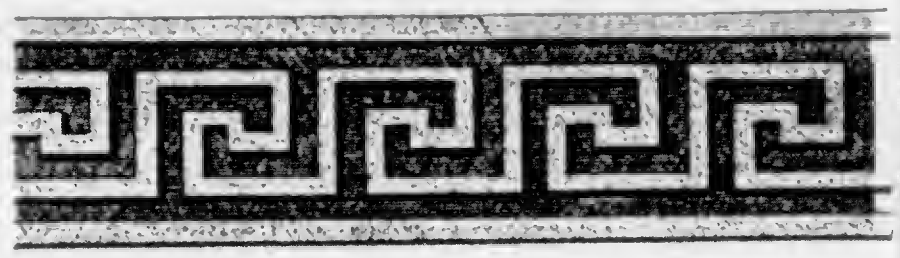

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T. PATERSON ROSS Architect and A. W. BURGREN Engineer

Frontispiece
The Architect and Engineer of California
May, 1908

THE
Architect and Engineer
Of California
Pacific Coast States

VOL. XIII. MAY, 1908. No. 1.

The Work of T. Paterson Ross and A. W. Burgren

THE work of Architect T. Paterson Ross and Engineer A. W. Burgren is shown in this number of the Architect and Engineer of California. With one or two exceptions the illustrations are of buildings designed and erected in San Francisco by this firm since the big fire two years ago. It is, indeed, a remarkable showing and Messrs. Ross and Burgren have good reason to feel proud of their part in the reconstruction of the burned city. Their line of work has been given a wide berth, embracing many classes and types of buildings, from the temporary shack put up in a hurry immediately after the fire to the stately Class A office building, the handsome four and five-story apartment house, the hotel, the church and the picturesque bungalow.

To Ross and Burgren more than any other architectural firm in San Francisco must be credited the responsibility for the radical changes that have been followed in the style and construction of buildings in the Oriental district. Where previously the rigid lines of cheap occidental building construction had provided perpendicular walls, now the fantasy of the Far East has been borrowed and in the Chinatown of today the pagoda style quite generally predominates.

One of the finest Ross and Burgren buildings occupies the corner of California and Montgomery streets and rises to a height of seven stories. It is called the Clunie building, and has been pronounced one of the best built fireproof office structures in San Francisco. Its heavy steel frame, reinforced concrete floors and massive stone and brick walls all contribute to make it a structure of unusual strength and beauty. The estimated cost of this building was $275,000. Another notable fireproof structure is the lerbach warehouse, which was one of the first great commercial buildings to be erected after the fire. It is of brick construction.

T. Paterson Ross, senior member of the firm, has been a practicing architect in San Francisco for fourteen years. He is a native of Edinburgh, Scotland. Mr. Burgren has been associated with Mr. Ross for six years, but not until after the fire was a partnership formed. Both men are comparatively young and by their close attention to work and indefatigable efforts to please they have established a clientage that others may well [illegible]. Mr. Ross is a member of San Francisco Chapter, A. I. A.

T. PATERSON ROSS, Architect and A. W. BURGREN Engineer

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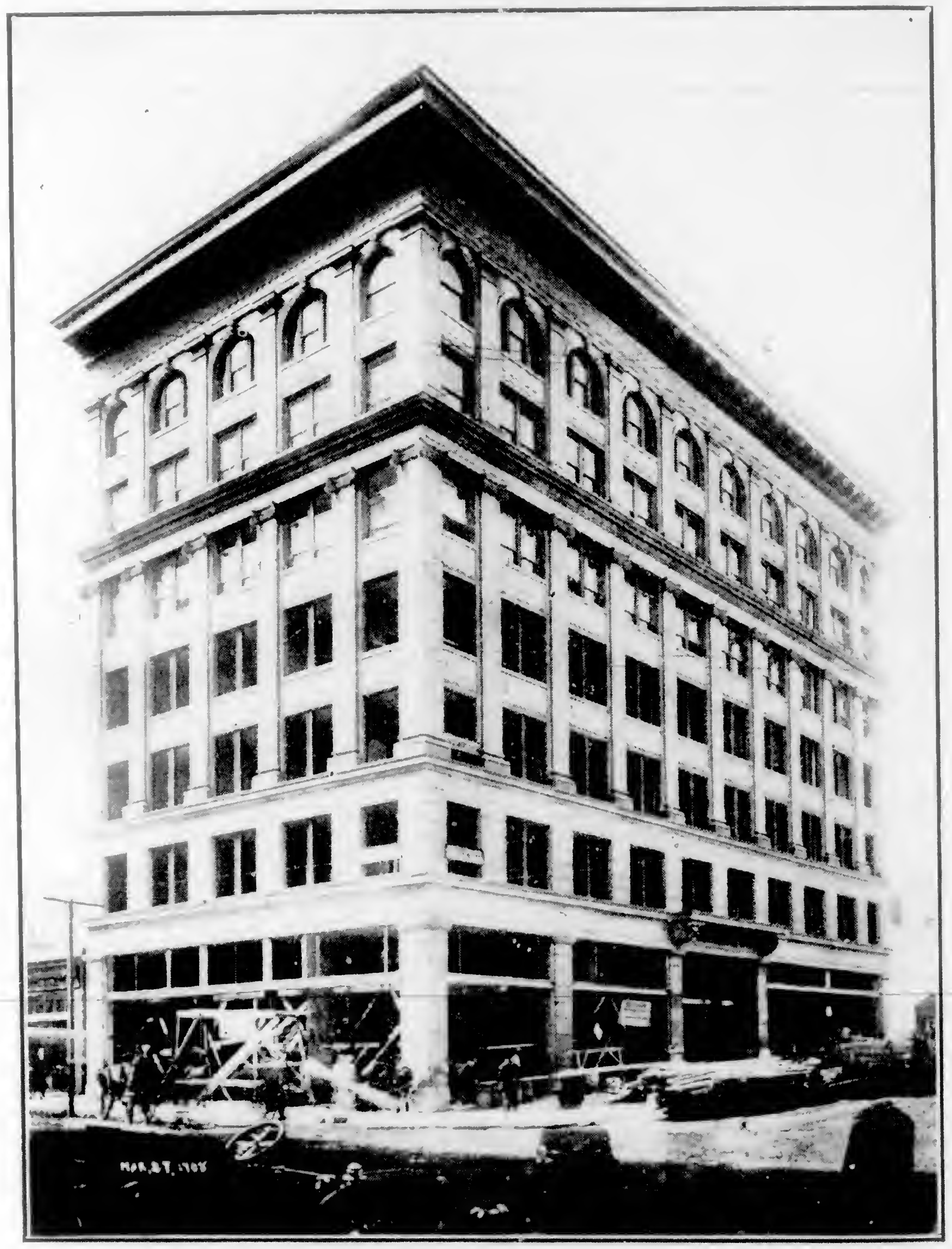

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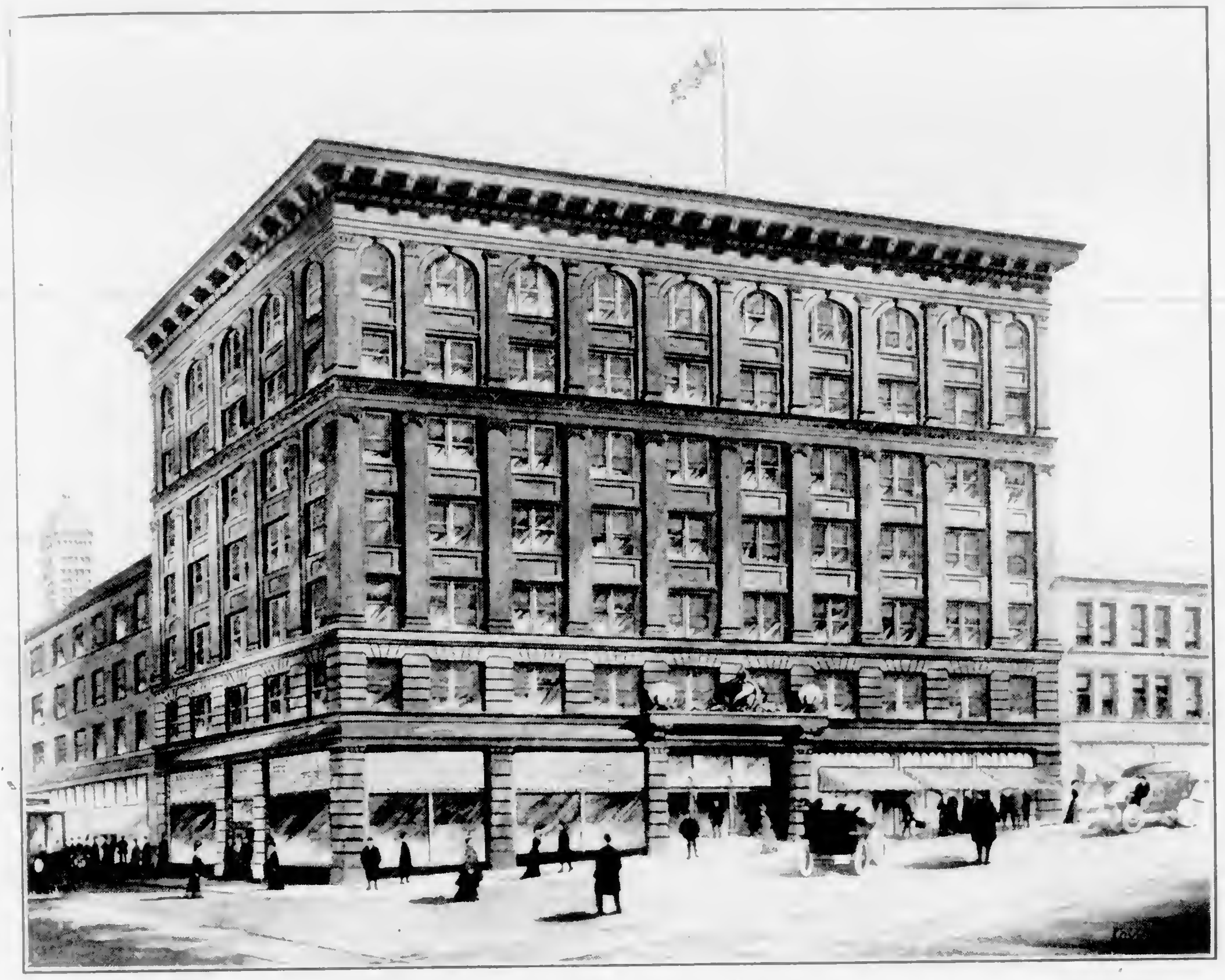
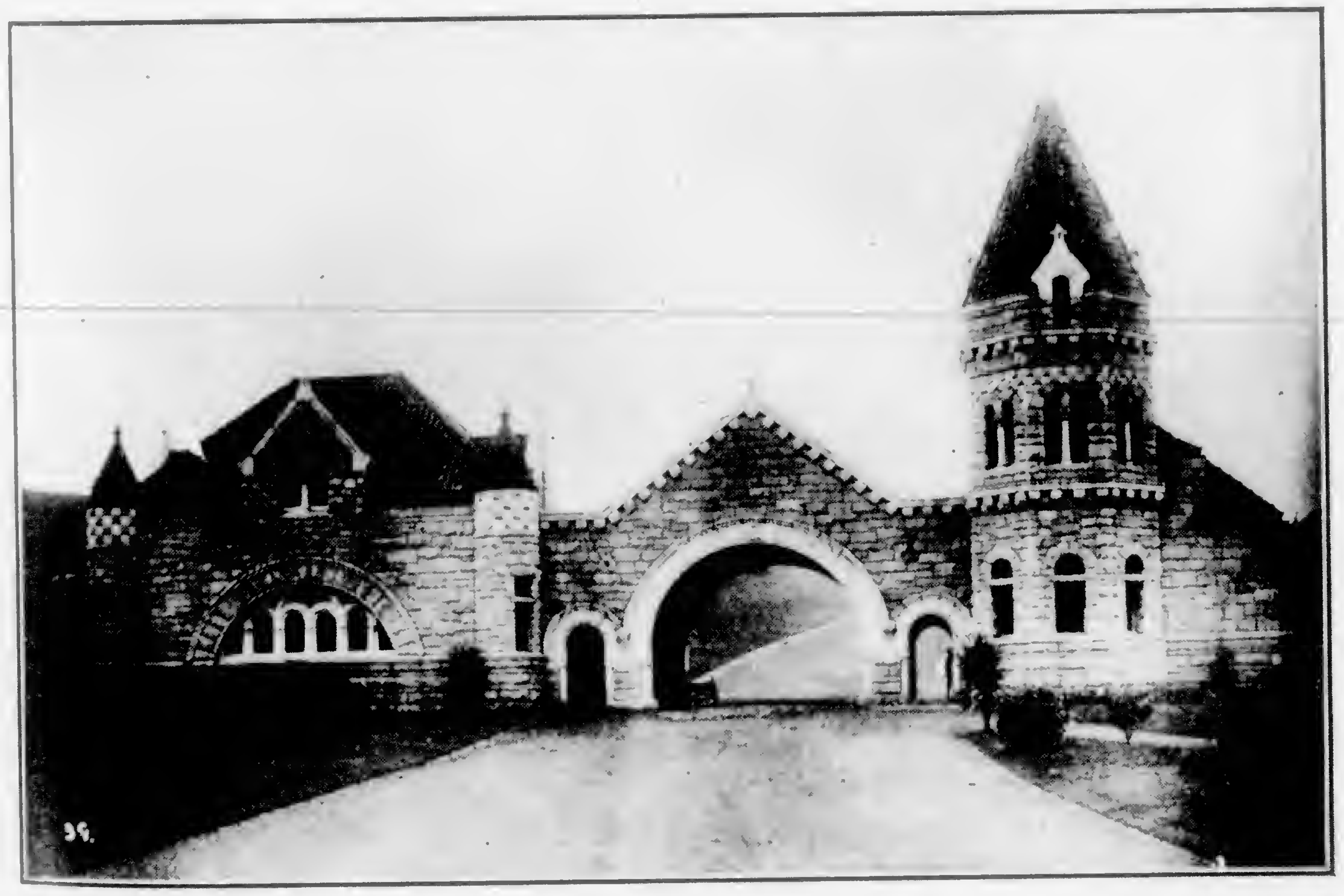
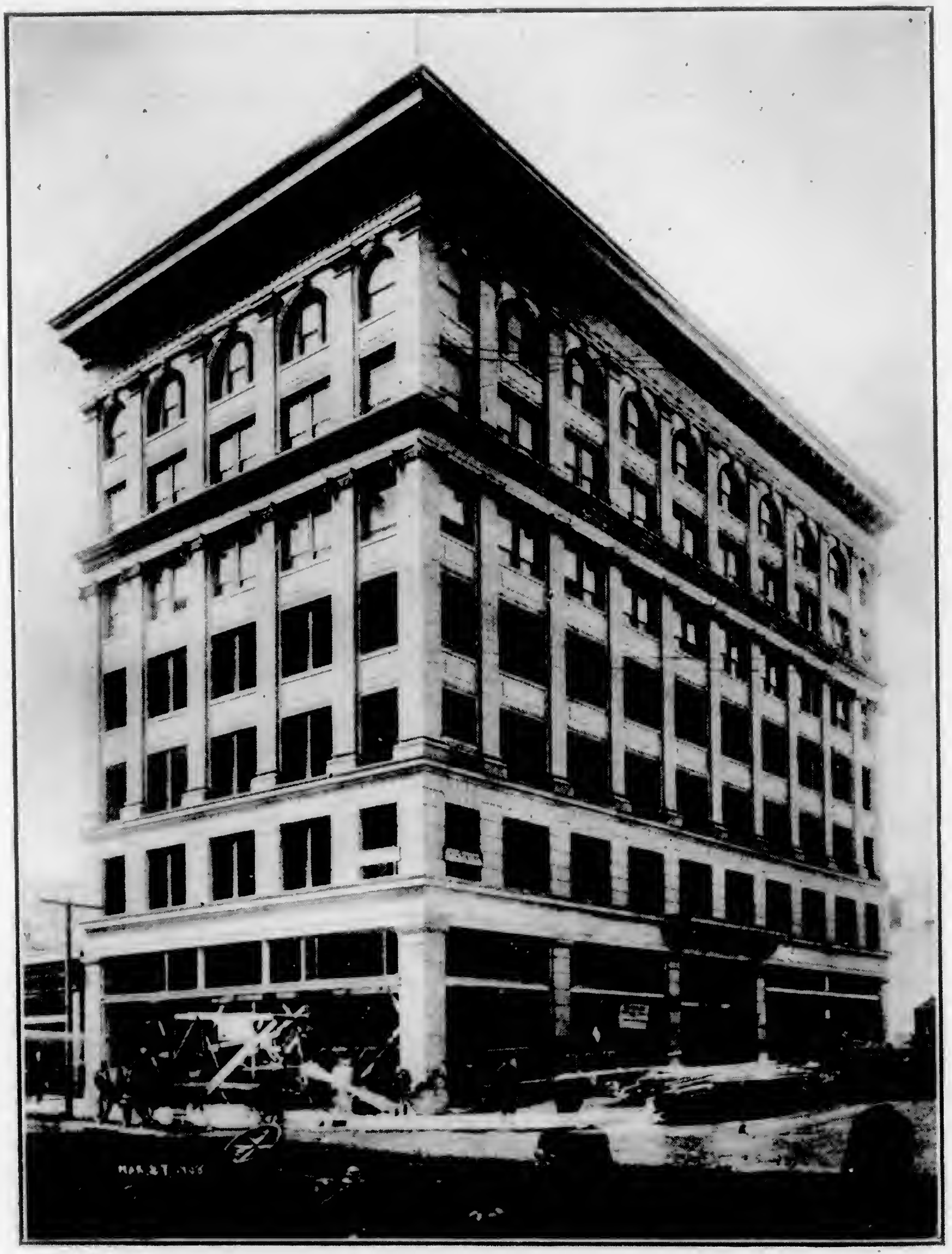
Fireproofed by the Roebling Construction Company Equipped with Otis Elevators
T. Paterson Ross, Architect A. W. Burgren, Engineer



Architect's Water Color of Clunie Building
T. Paterson Ross, Architect A. W. Burgren, Engineer



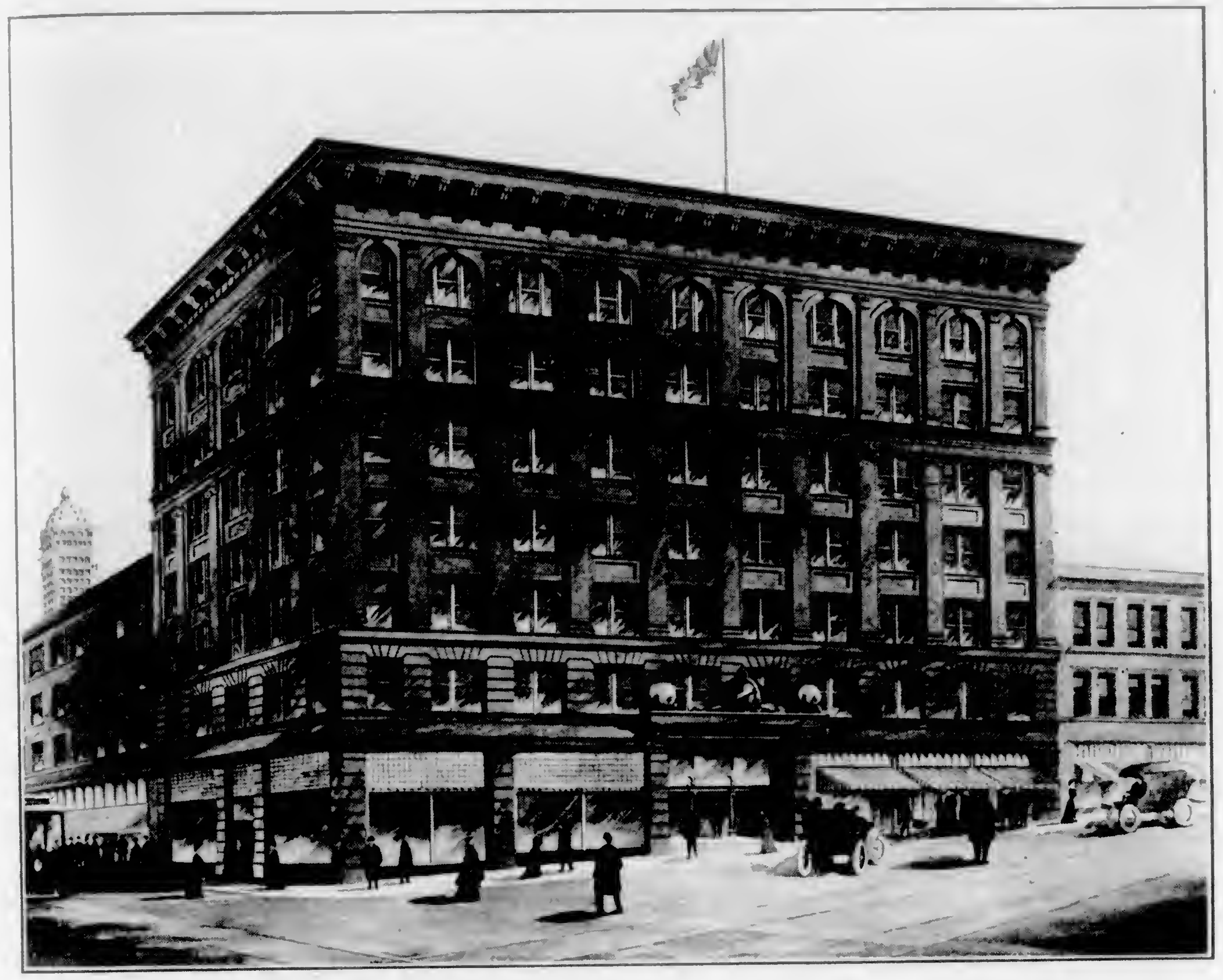
Masonic Cemetery Entrance, San Mateo County, Cal.
T. Paterson Ross, Architect



Clunie Office Building, San Francisco

Fireproofed by the Roebling Construction Company Equipped with Otis Elevators

T. Paterson Ross, Architect A. W. Burgren, Engineer



Architect's Water Color of Clunie Building

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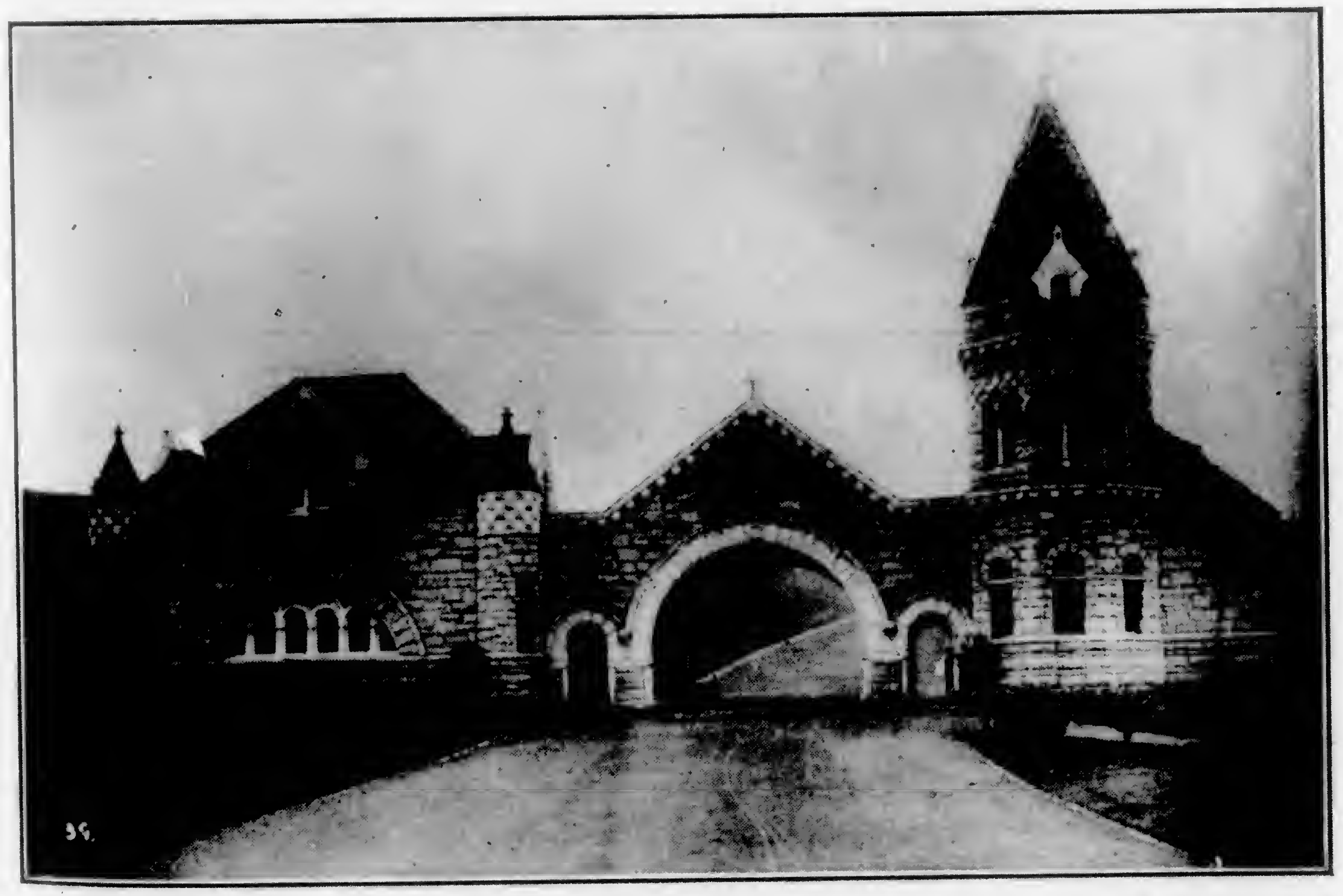

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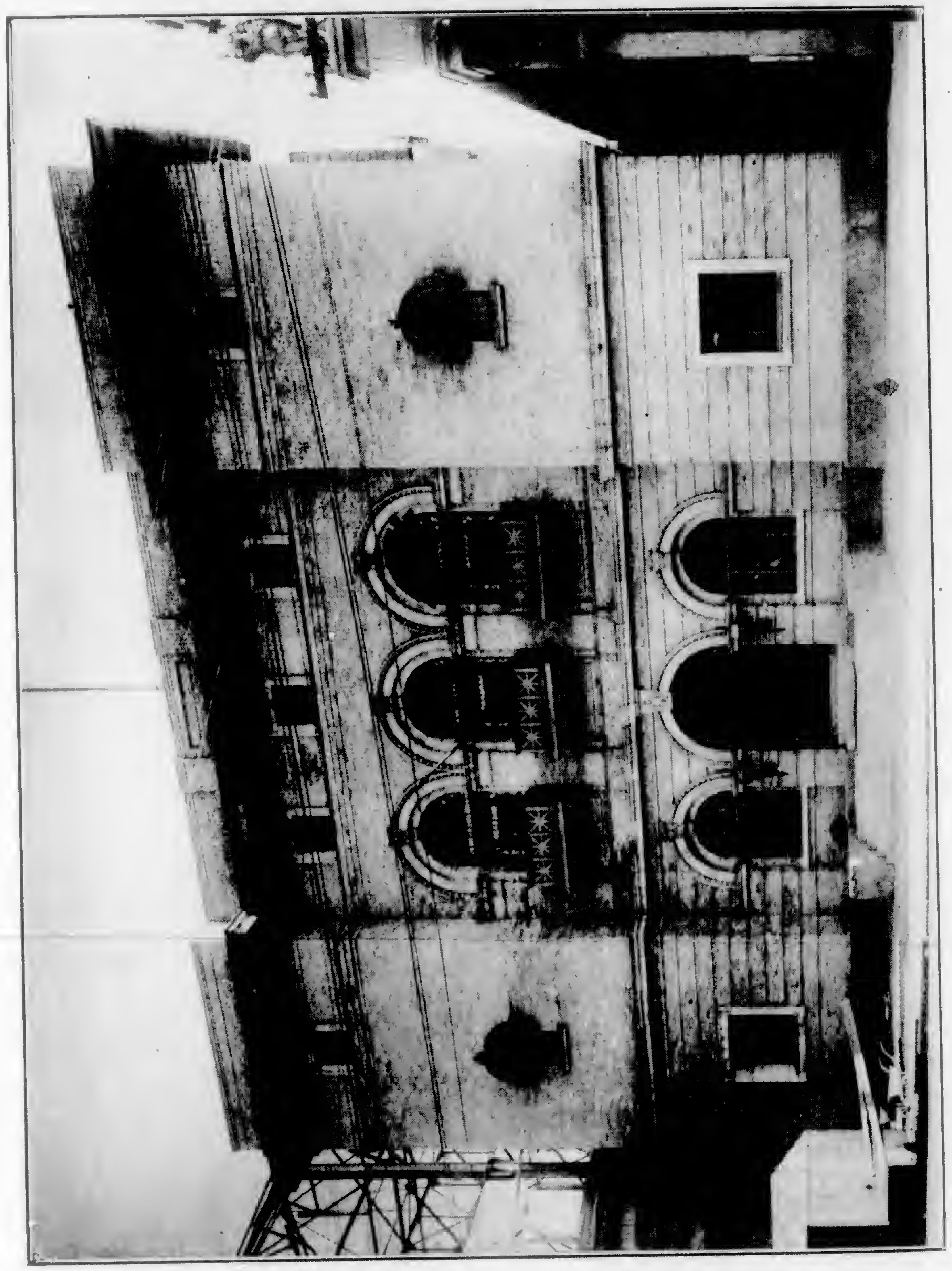
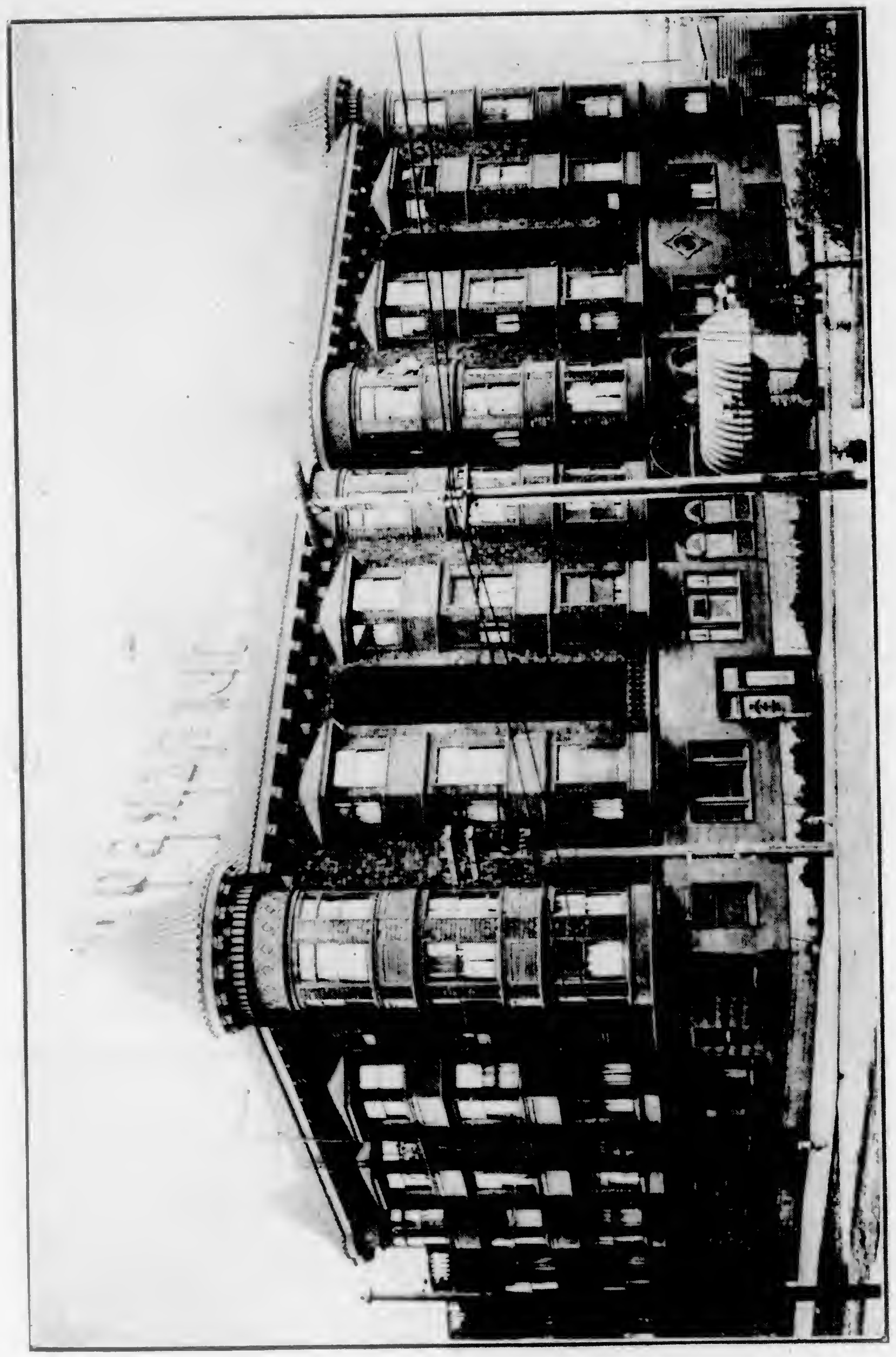
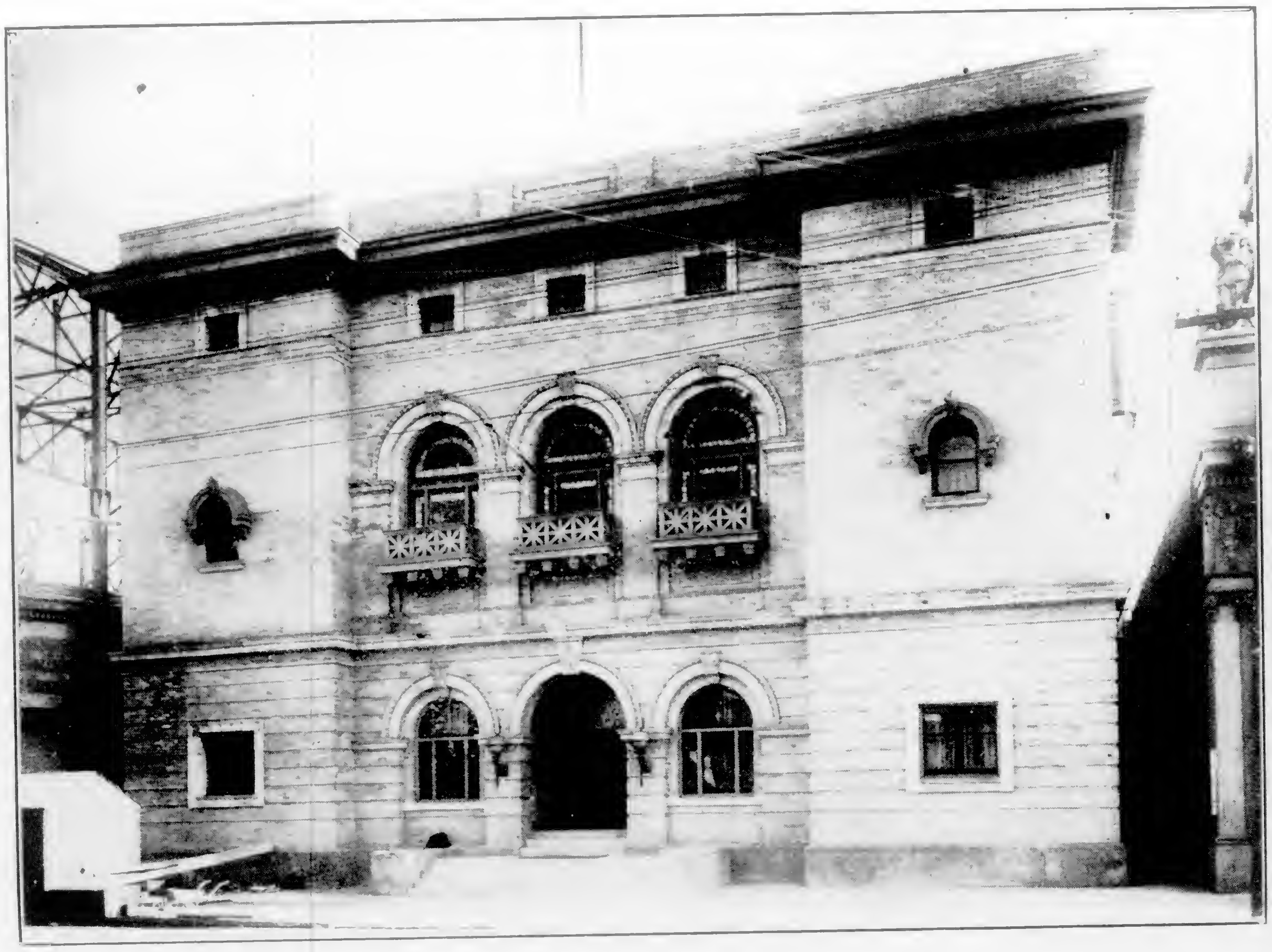


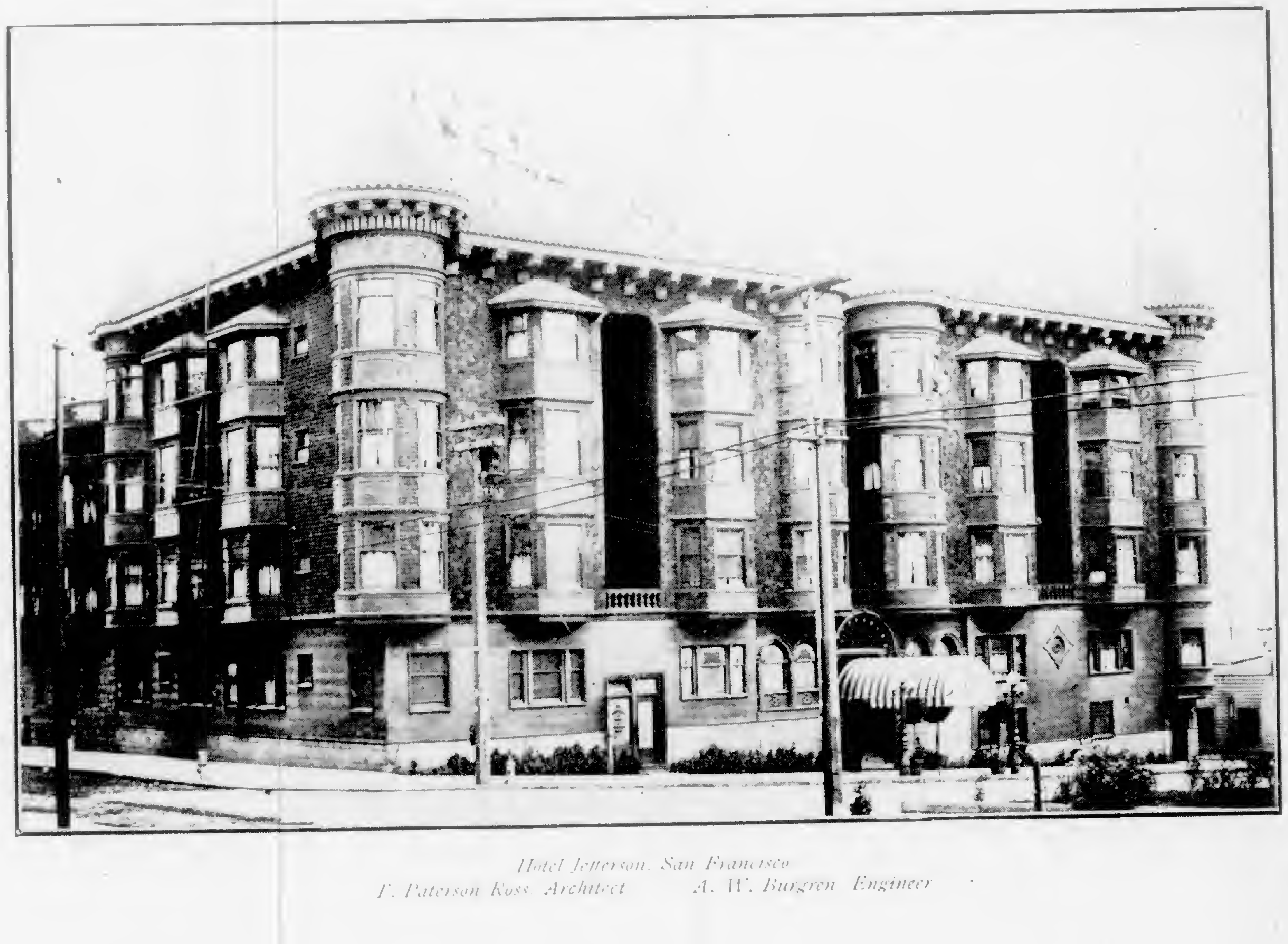
Albert Pike Memorial Building, San Francisco
T. Paterson Ross, Architect A. W. Burgren, Engineer



Hotel Jefferson, San Francisco
T. Paterson Ross, Architect A. W. Burgren Engineer



[illegible] Masonic Building, San Francisco
T. Paterson Ross, Architect A. W. Burgren, Engineer



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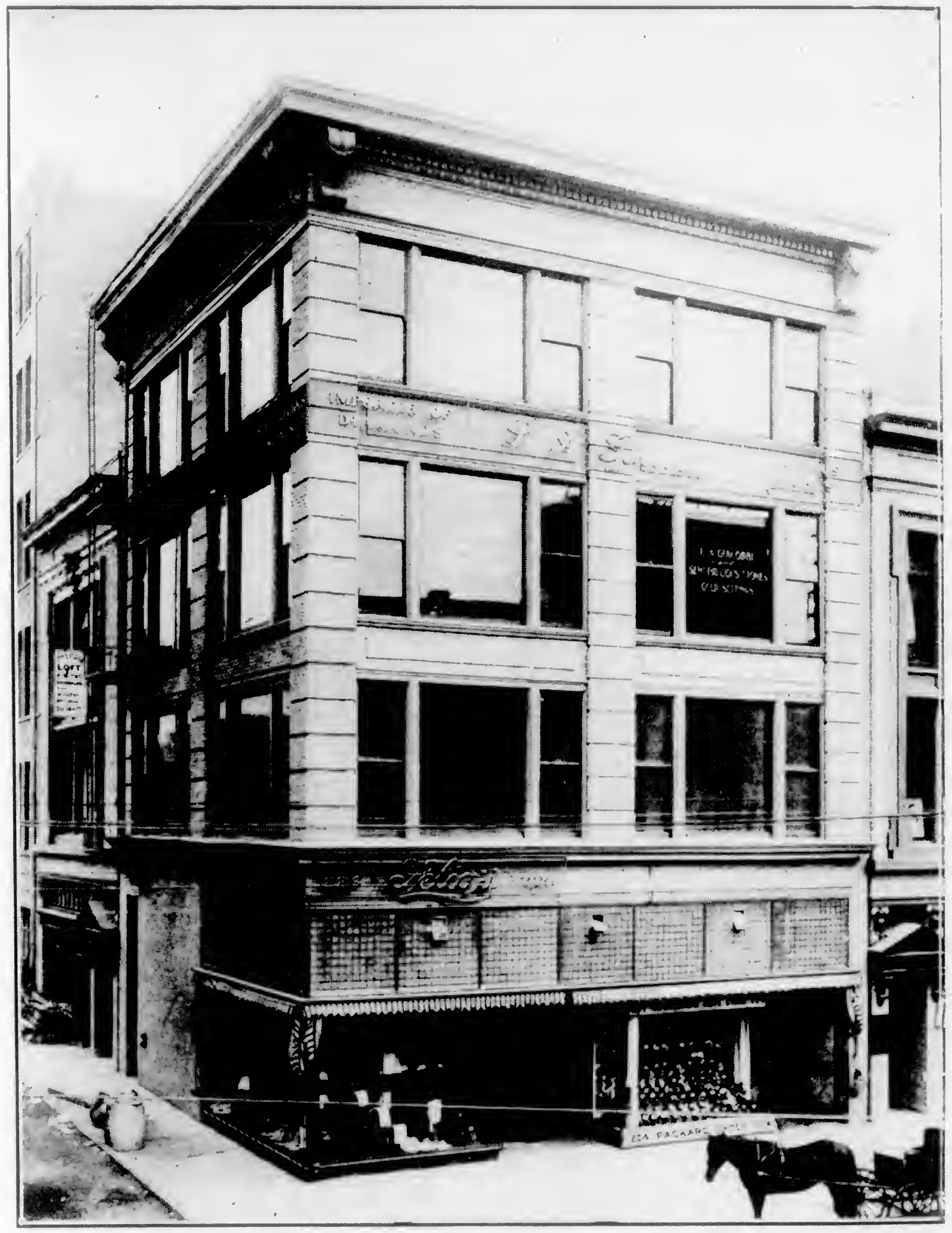
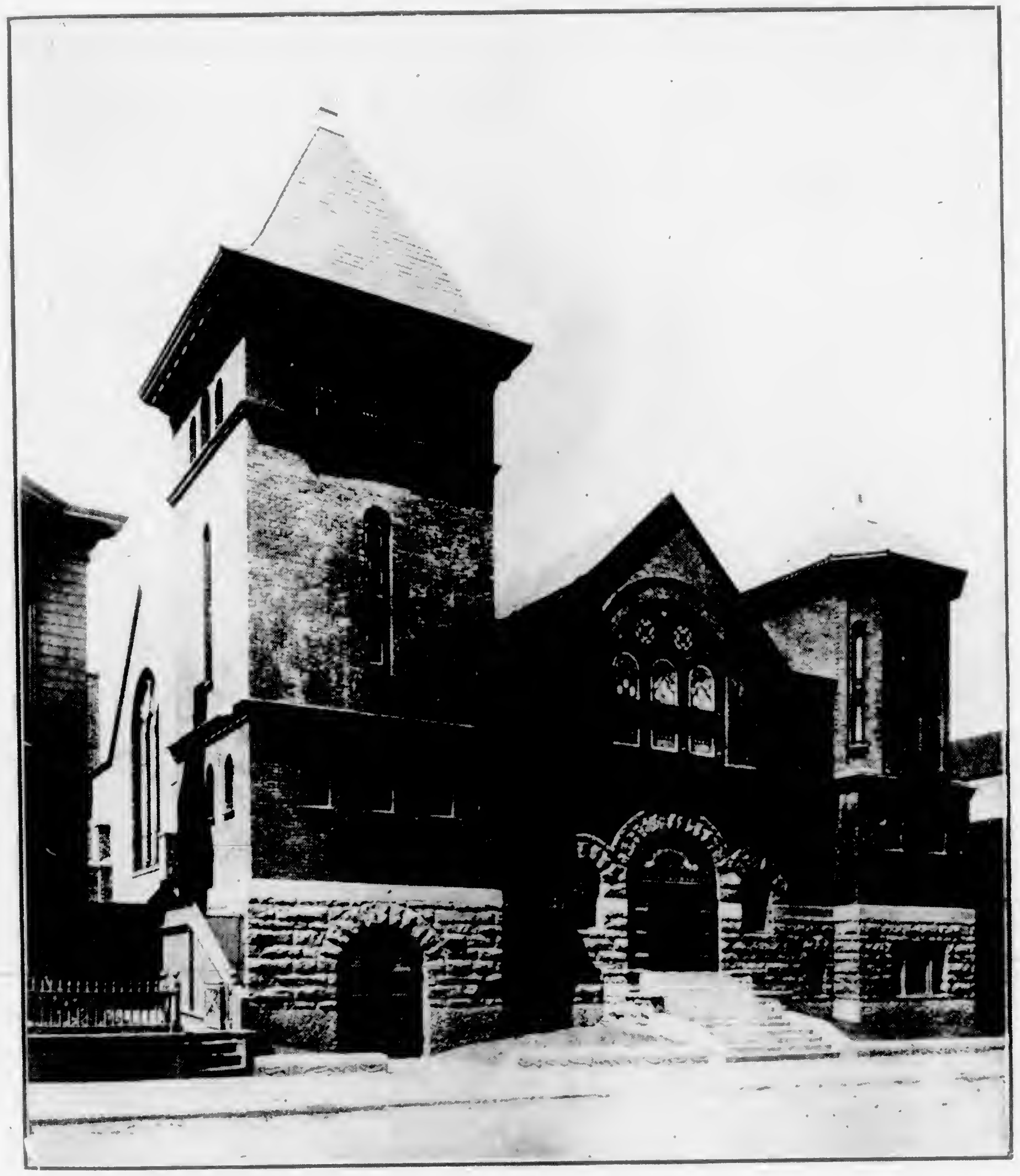
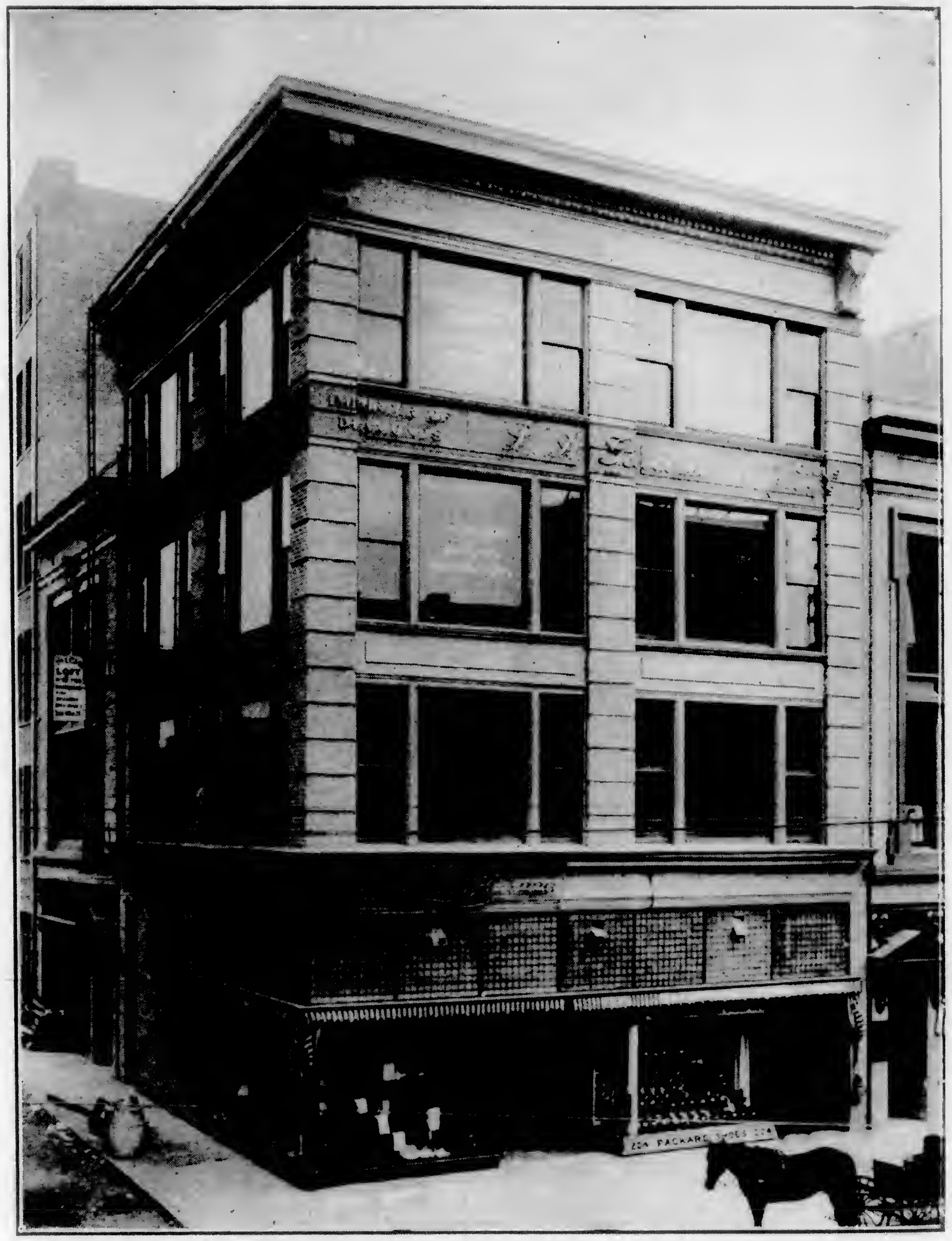


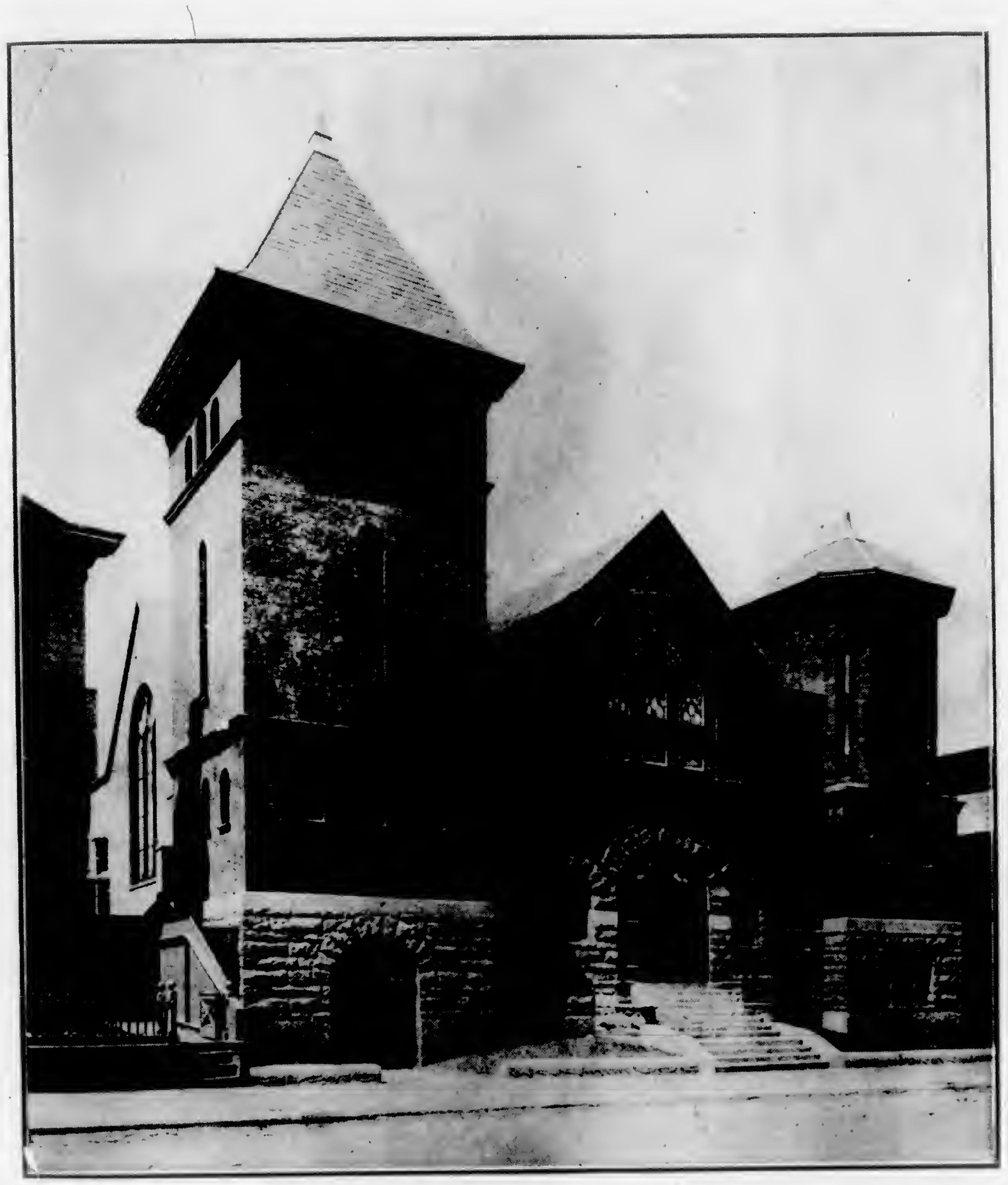
Robins Building, San Francisco
T. Paterson Ross, Architect *A. W. Burgren, Engineer*



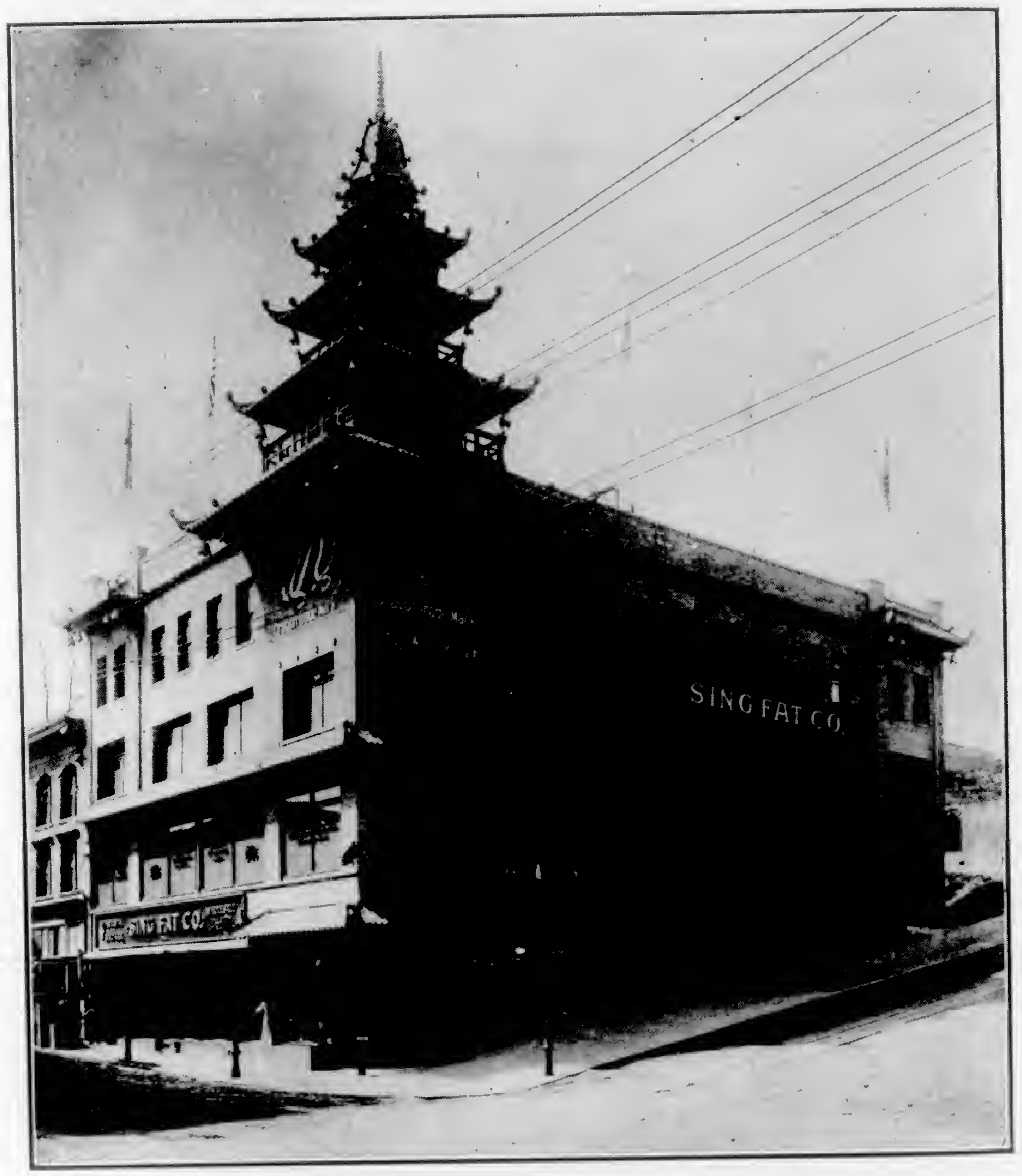
West Side Christian Church, San Francisco
T. Paterson Ross, Architect *A. W. Burgren, Engineer*



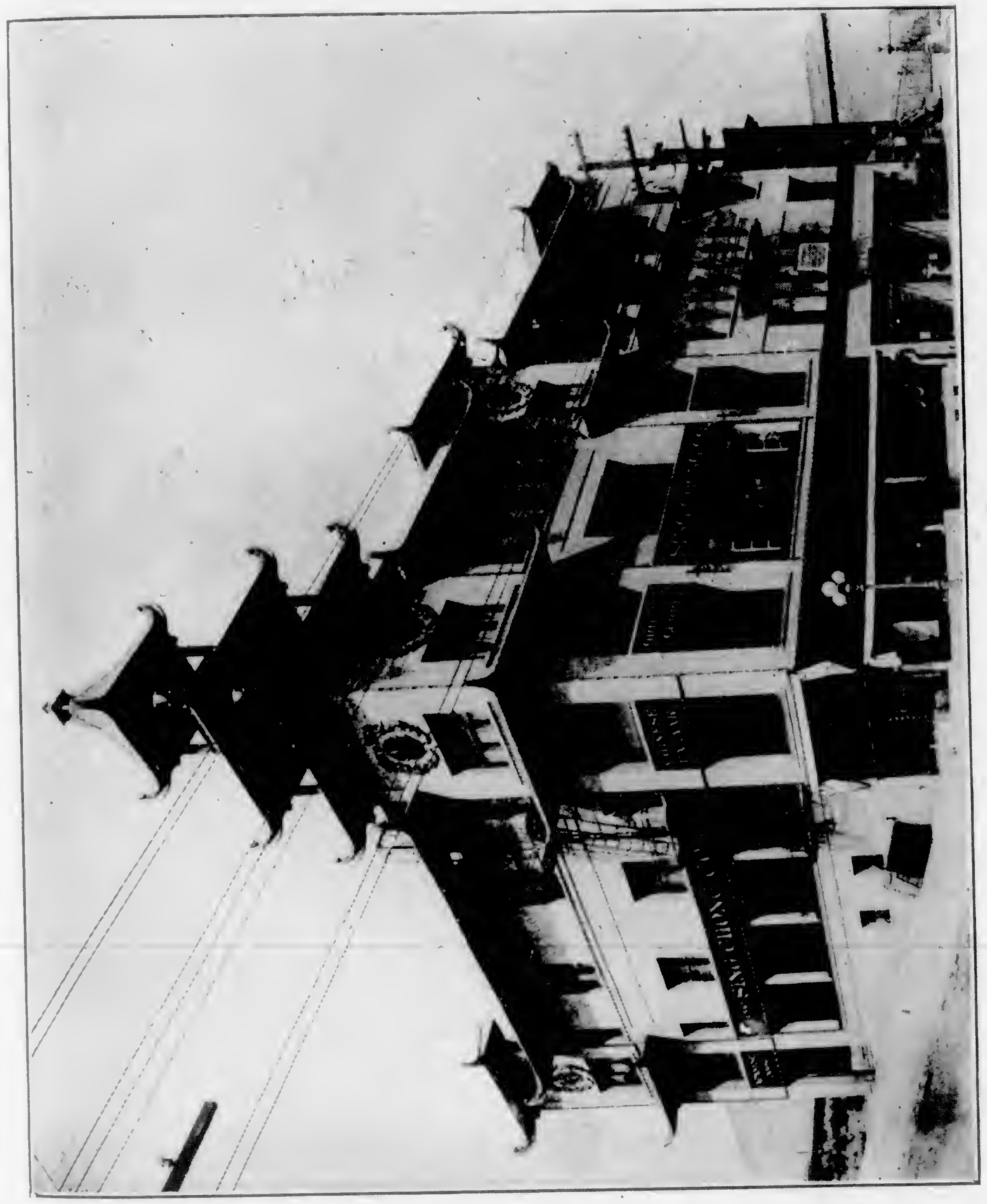
Robins Building, San Francisco
T. Paterson Ross, Architect A. W. Burgren, Engineer



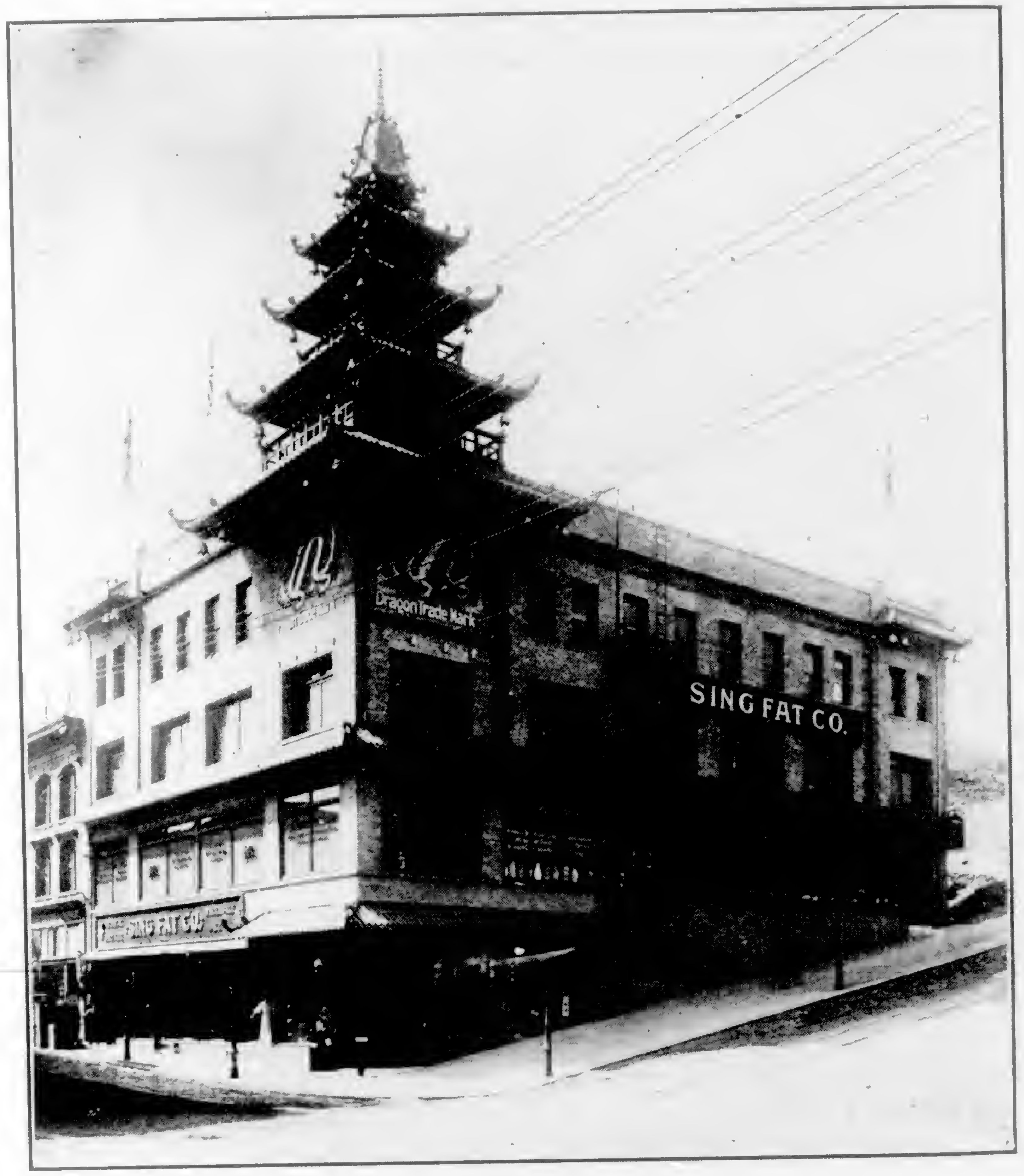
West Side Christian Church, San Francisco
T. Paterson Ross, Architect A. W. Burgren, Engineer



Sing Fat Building, Chinatown, San Francisco
T. Paterson Ross, Architect *A. W. Burgren, Engineer*
Equipped with Otis Elevators



Sing Chong Building, Chinatown, San Francisco
T. Paterson Ross, Architect *A. W. Burgren, Engineer*
Equipped with Otis Elevators


Dragon Trade Mark
SING FAT CO.
SING FAT CO.

Sing Fat Building, Chinatown, San Francisco
T. Paterson Ross, Architect *A. W. Burgren, Engineer*
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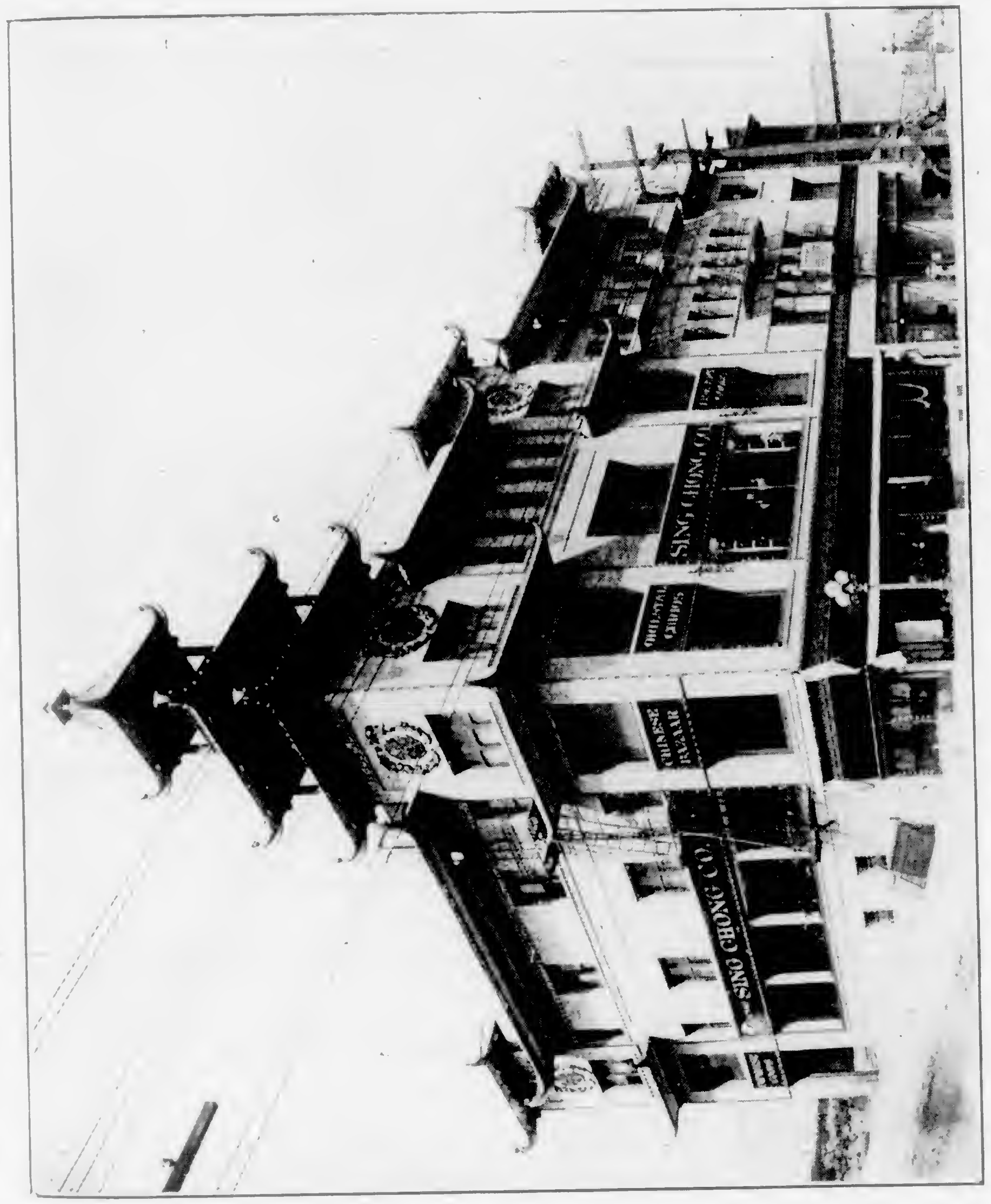
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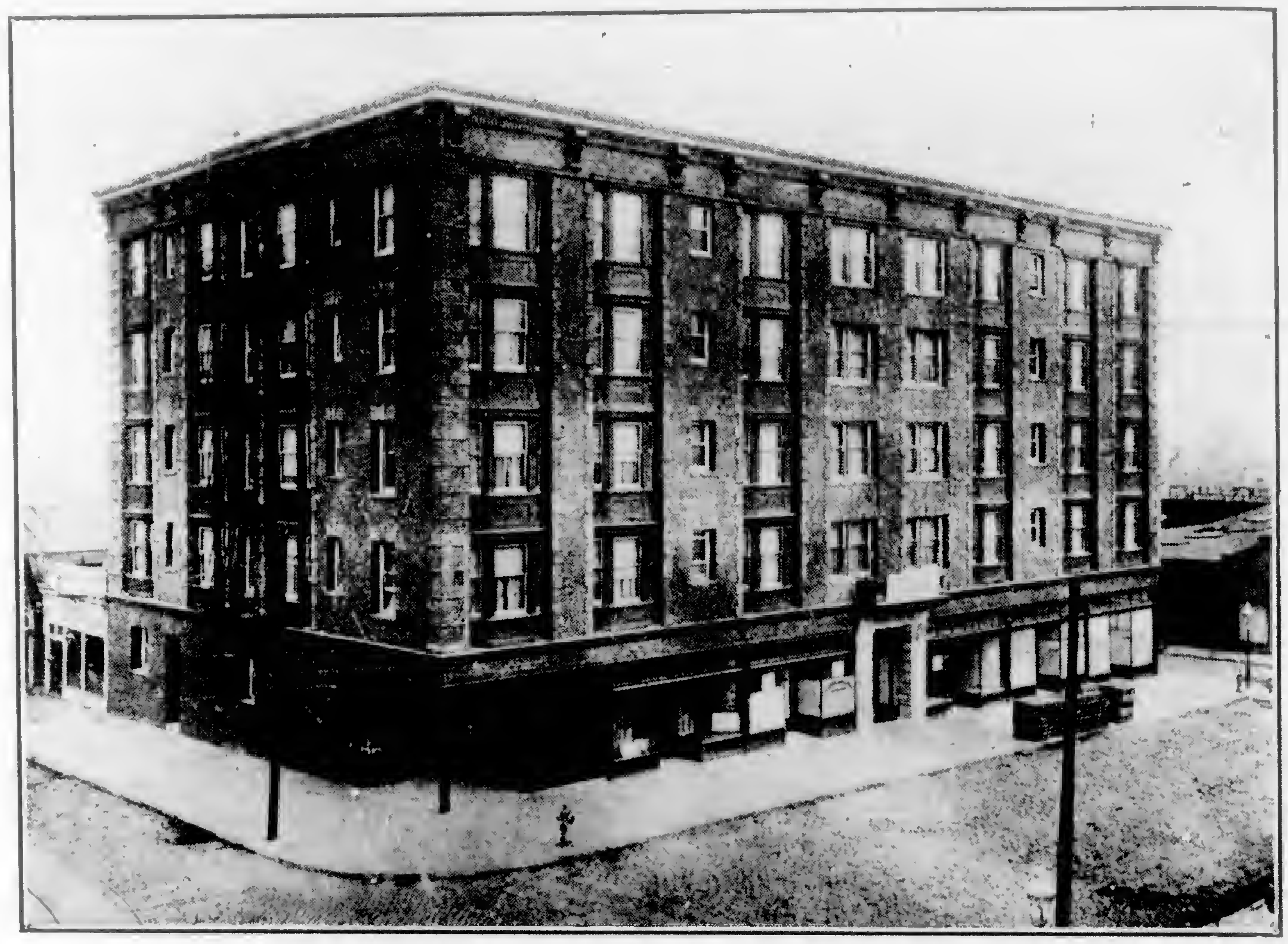
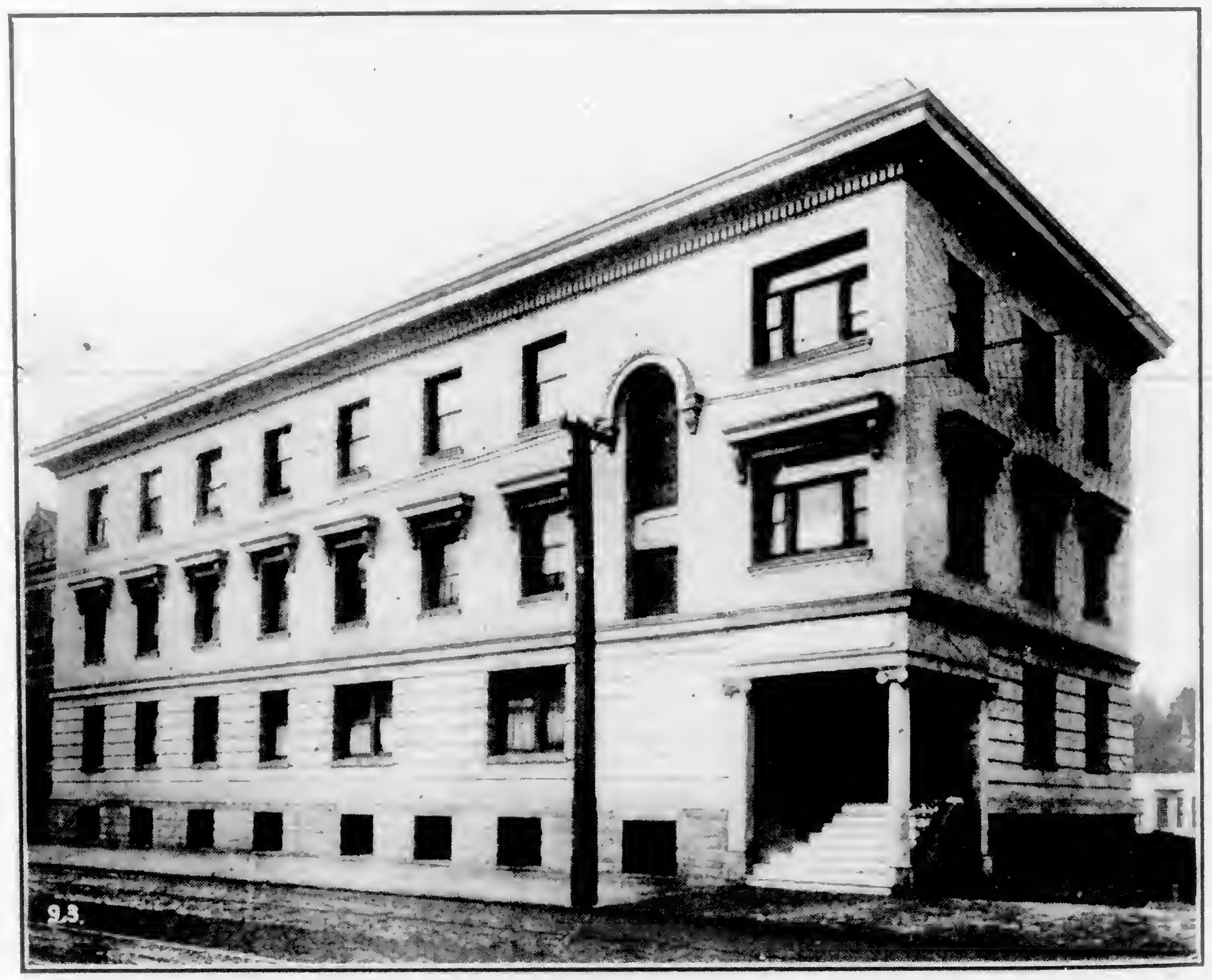
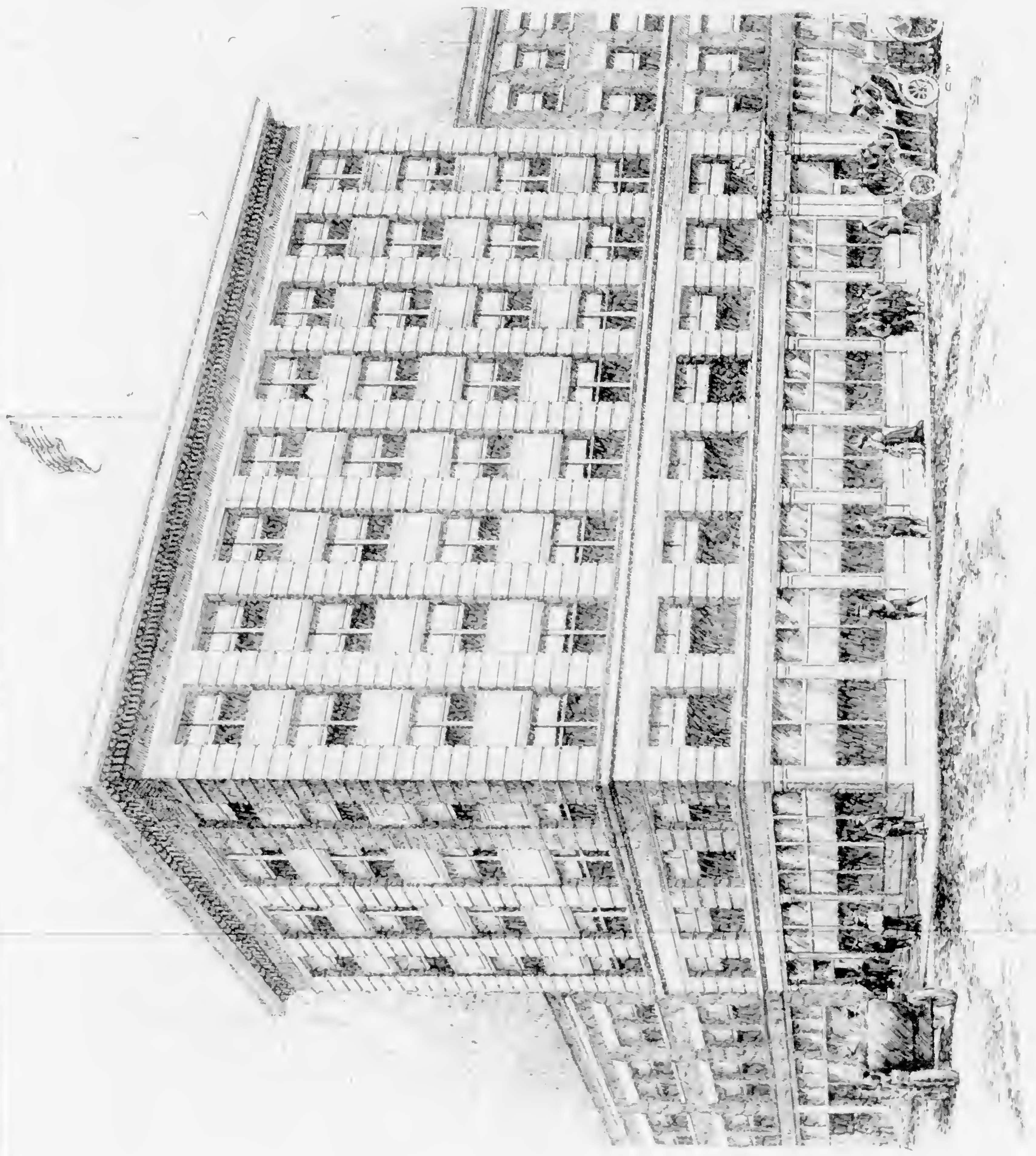


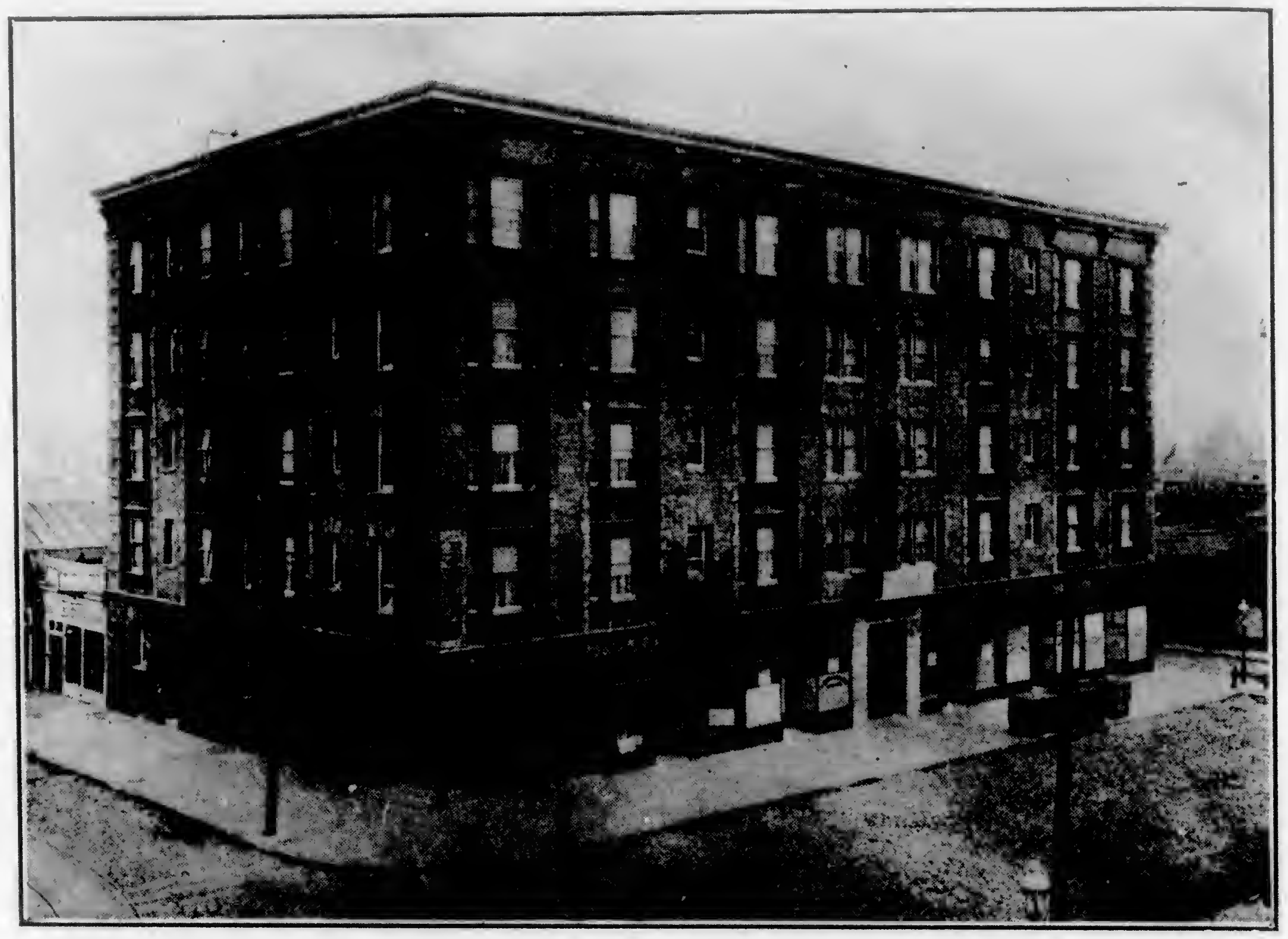
Baldwin Apartments, San Francisco
T. Paterson Ross, Architect *A. W. Burgren, Engineer*



Scobie Hospital, Page Street and Masonic Avenue, San Francisco
T. Paterson Ross, Architect *A. W. Burgren, Engineer*



Donahoe Building, San Francisco
T. Paterson Ross, Architect *A. W. Burgren, Engineer*
Equipped with Otis Elevators



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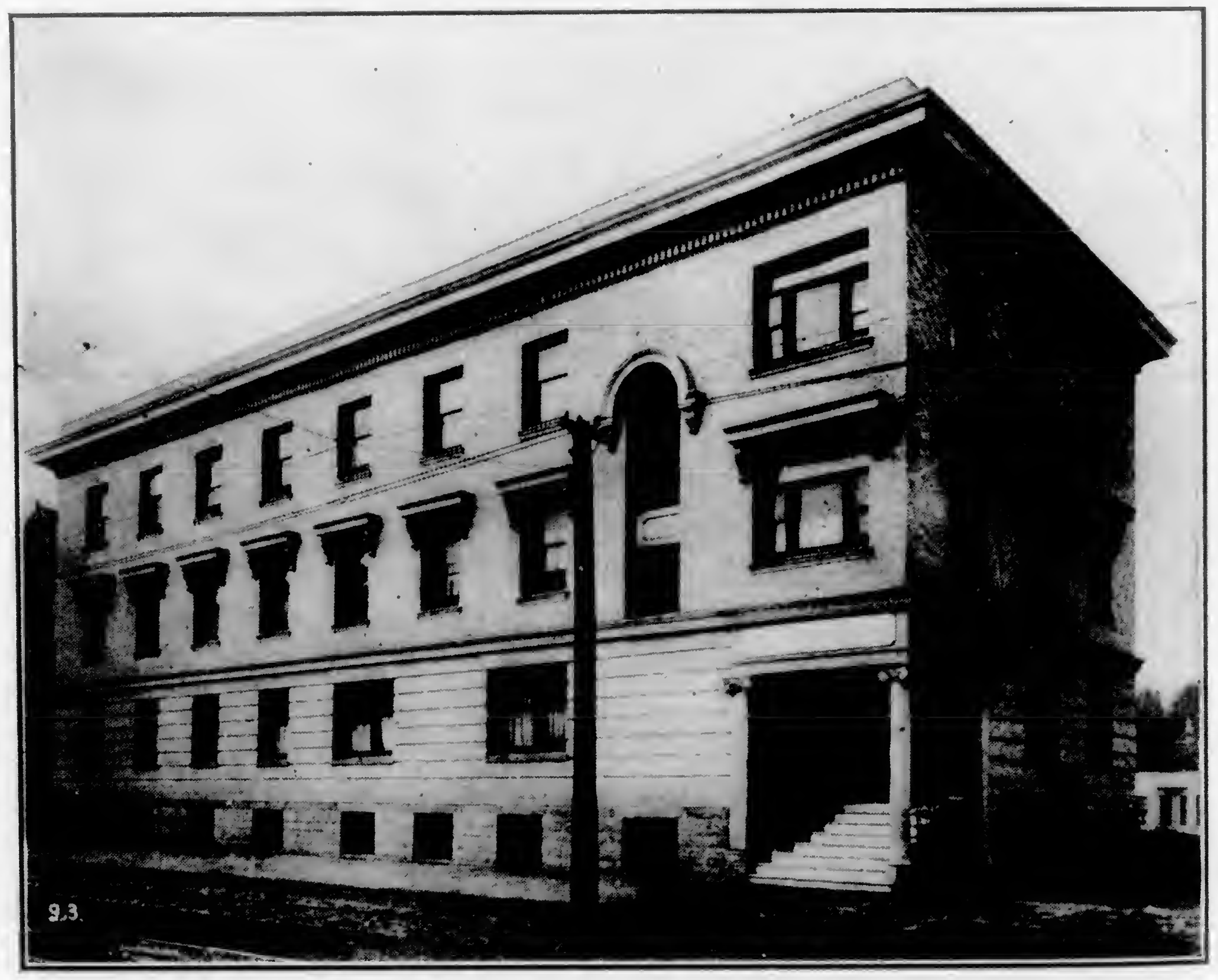

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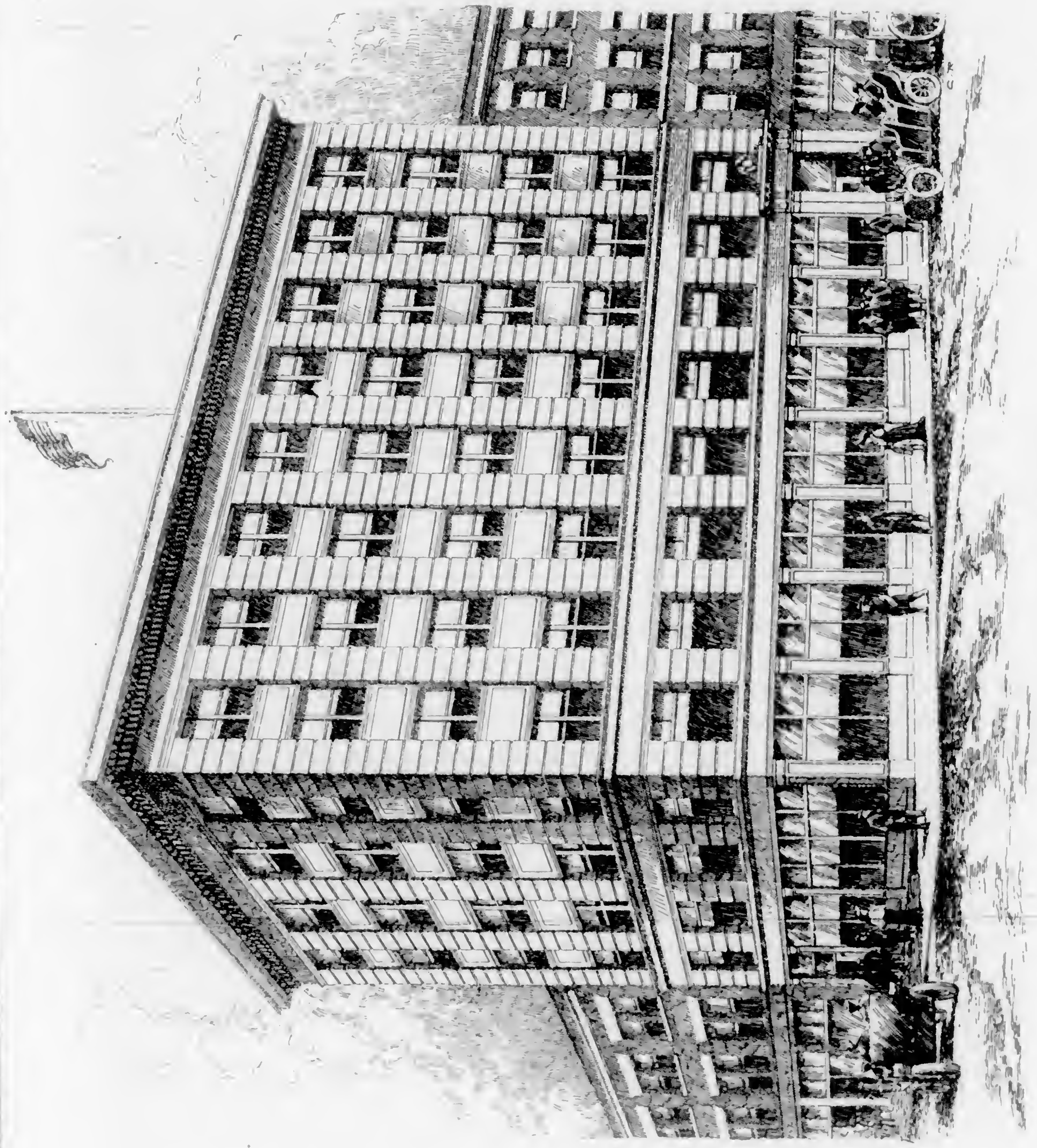

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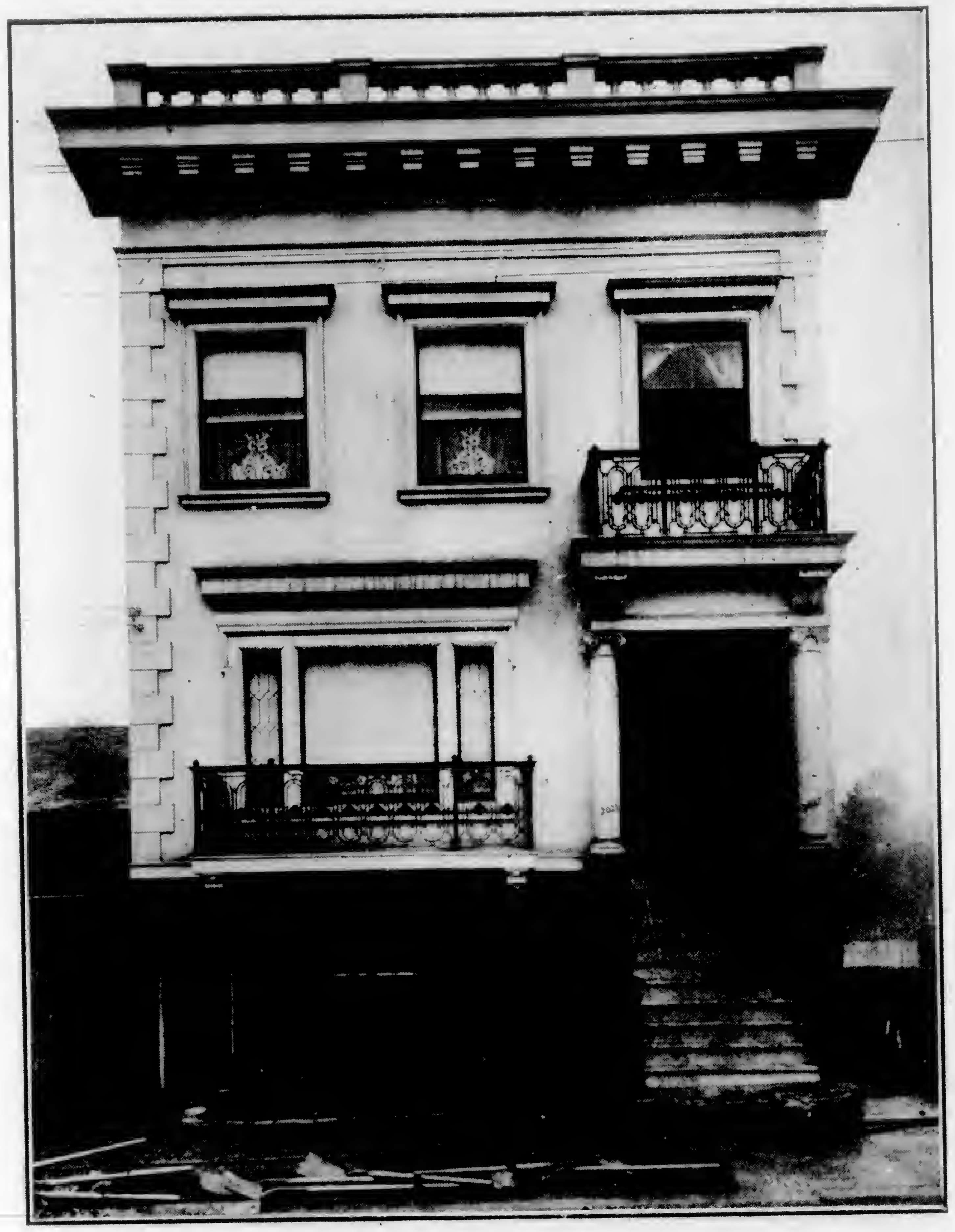


Henderson Flats, Hayes Street, San Francisco
T. Paterson Ross, Architect *A. W. Burgren, Engineer*

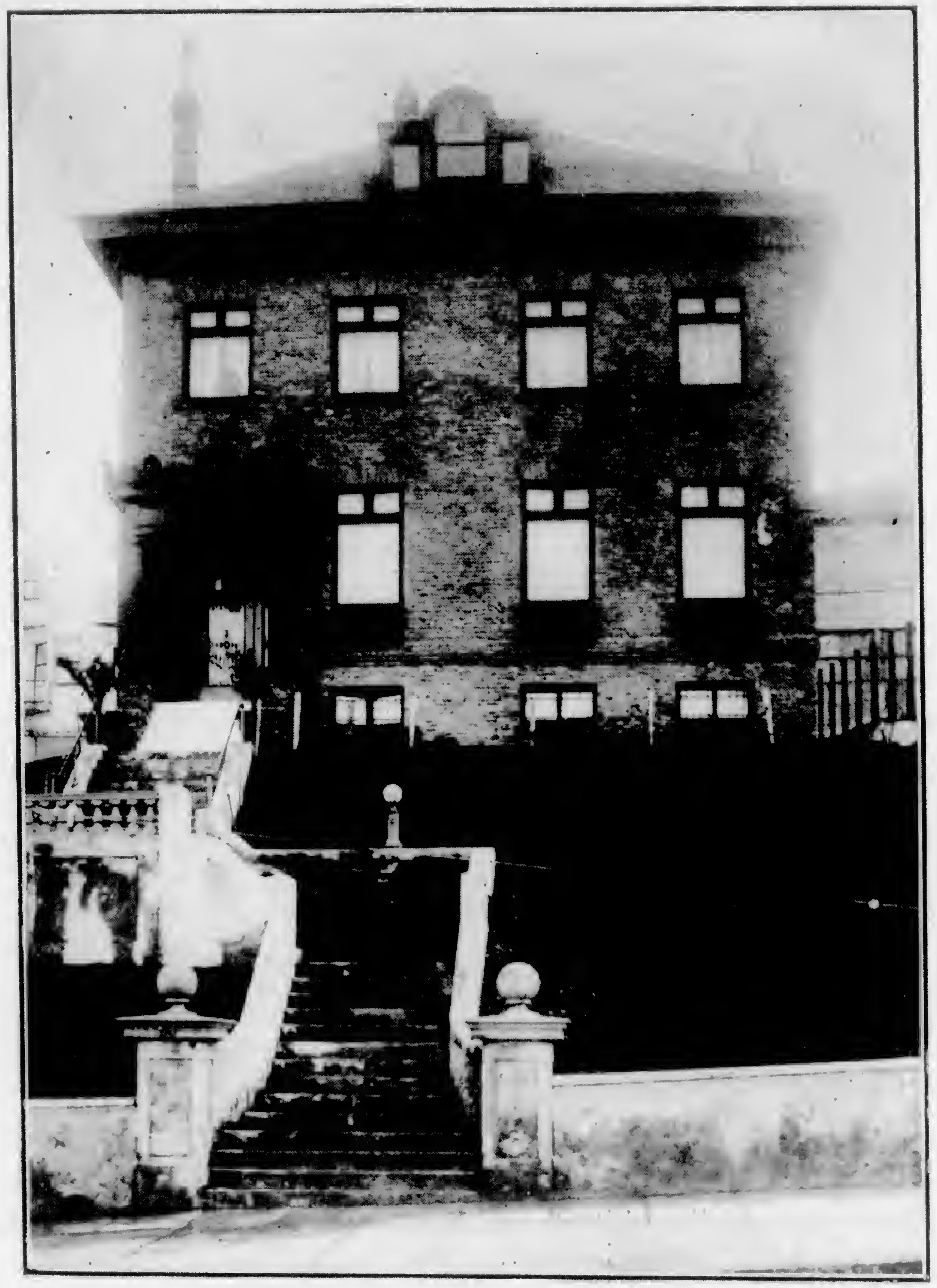
Treatment of Concrete Surfaces*

By E. B. GREEN, Architect, Buffalo, N. Y.

I NEED not tell you that the architect's interest in the uses of cement is second only to your own. But while you are enabled to give your entire time and thought to cement construction, his interests are necessarily divided among many methods of construction and various materials.

When you think of the various things that enter into the construction of a modern building, of which he must have more than a passing knowledge, and to no one of which must he give an undue weight, it will appeal to you that the interest which he takes in concrete construction must be somewhat less than yours.

* Paper read before the National Association of Cement Users.

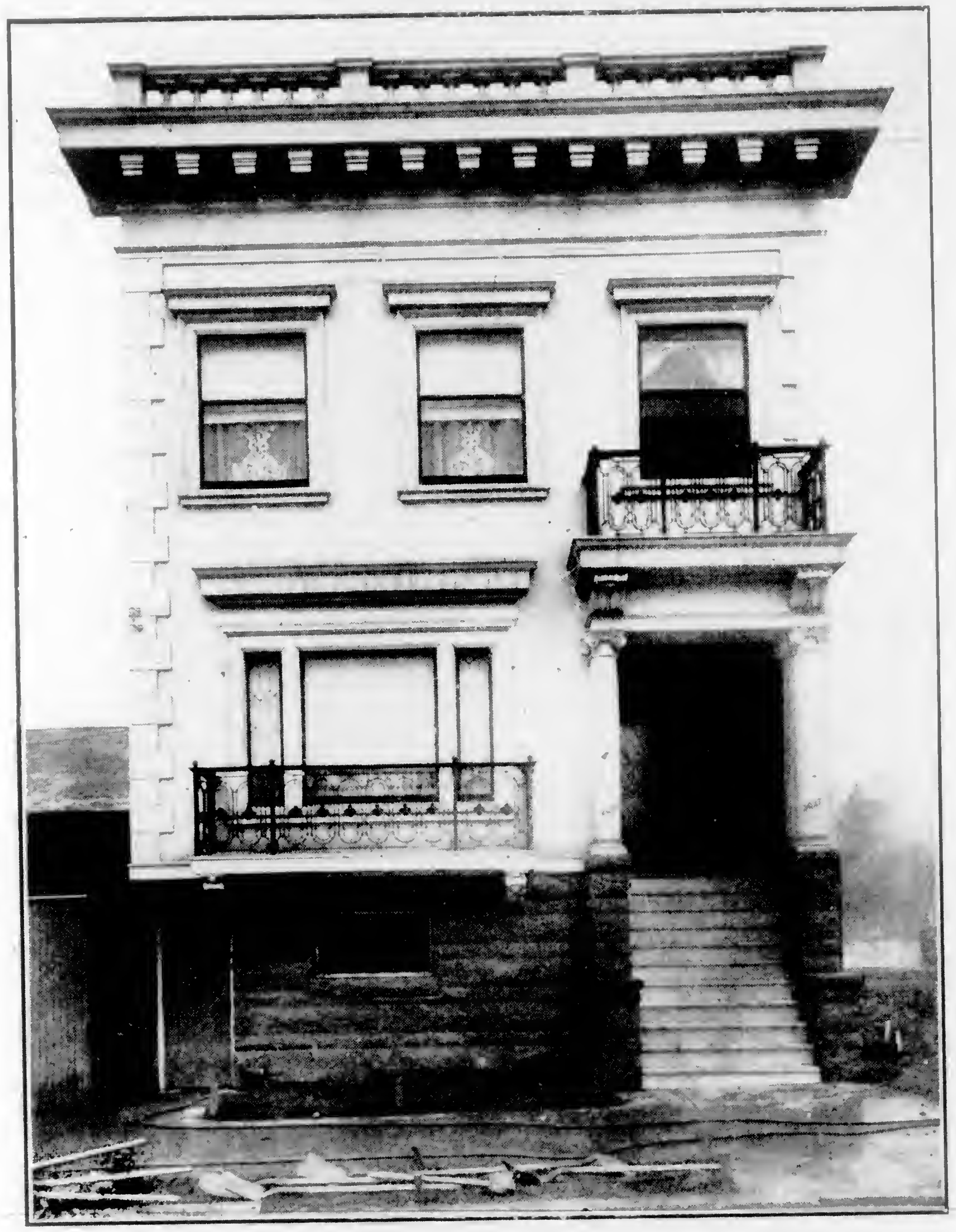


Residence of Mr. Chas. G. Gebhardt, San Francisco
T. Paterson Ross, Architect *A. W. Burgren, Engineer*

He cannot pretend to become an expert in any one method of construction, and it therefore gives us pleasure and much profit to become acquainted and be surrounded with those who devote their efforts and intellectual forces to one or two channels in the art of building.

Architects, as a class, are conservative, and our energies and thoughts are given to the designing, to the form of the structure. The carrying out of the work is best left to those equipped for that special purpose. We, of course, must be conversant with the various methods of fabricating the material in order to design the structure properly.

As yet, our profession rests primarily upon that of form, scale and the disposition of mass and voids (which is the design) more than on the methods or materials of construction.



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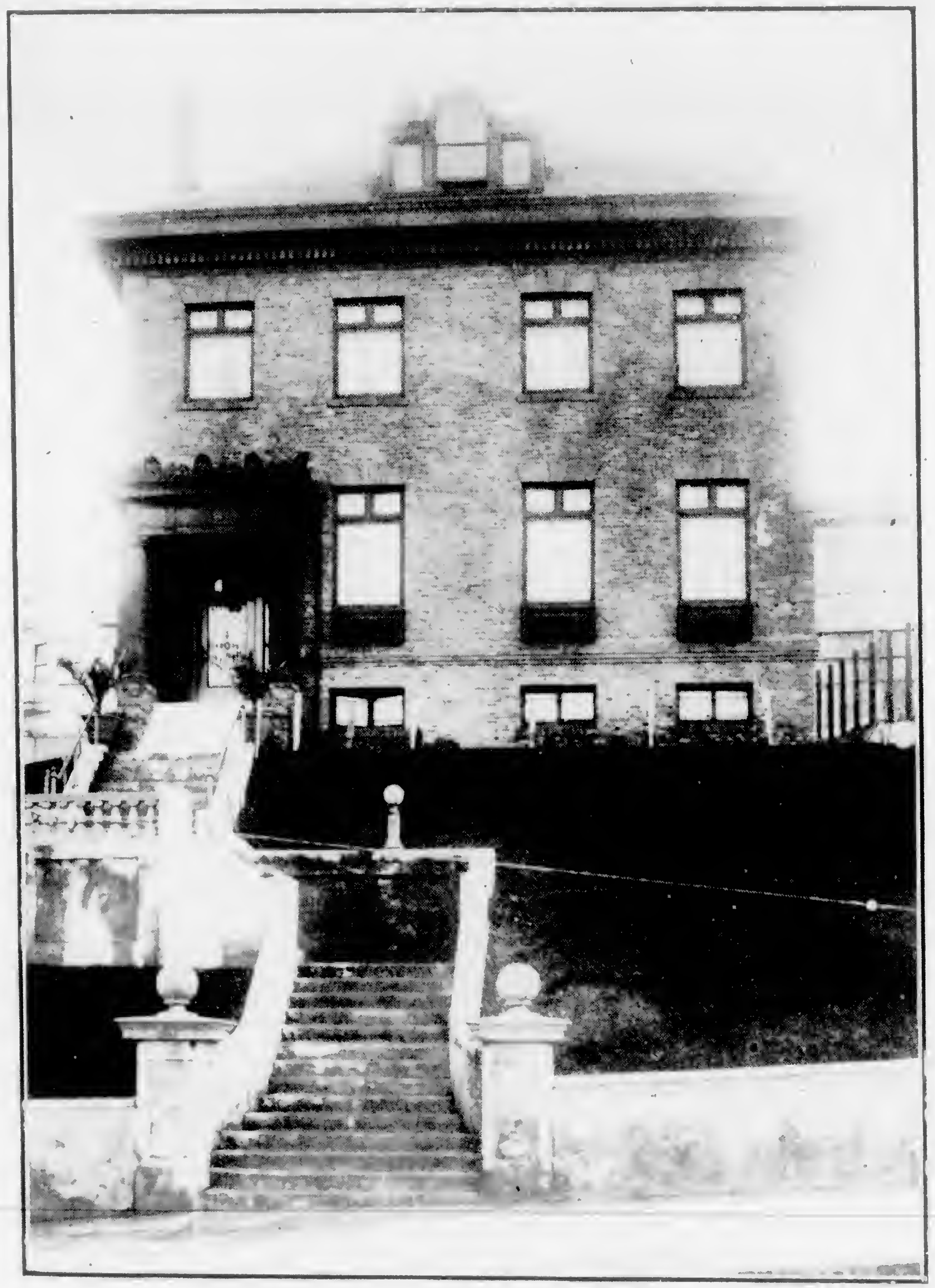

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Hotel Avalon, San Francisco
T. Paterson Ross, Architect
A. W. Burgren Engineer

I may say that all architects are looking forward to the study of this question with the keenest interest. We have become familiar with the structural side, and are constantly urged to take up the esthetic side of the use of concrete. It holds forth tremendous possibilities, and the day will be a happy one when you have devised methods for the use of cement which will make it possible to do away with wood construction in all city buildings. Can we realize what it would mean to have all our buildings in this city fireproof—the lessening of taxation, to say nothing of the danger from fire?

To tell you the interest which the architects are taking in the subject of concrete and reinforced concrete, I will say that nearly two days out of the four allotted to the annual meeting of the American Institute of Architects were devoted to the discussion of concrete, and we had some pretty stirring times and a good deal of ripping up the back of old methods, and it did us all a lot of good. Still the consensus of opinion at the end seemed to be one of uncertainty and caution—we must be careful. The methods are not yet on the same basis as masonry construction and the manufacture of steel, for instance. It is difficult, if not impossible, to make a te

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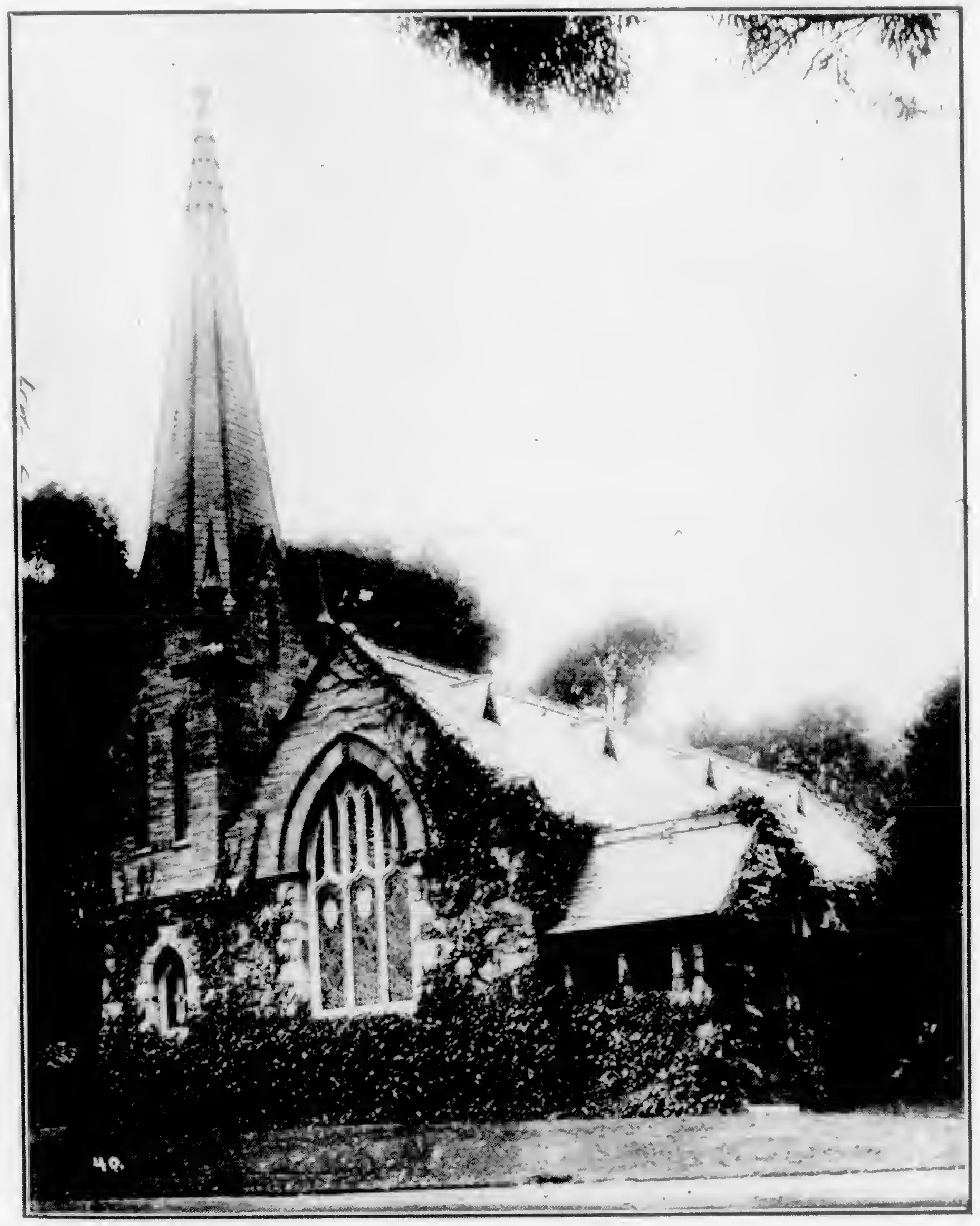
The question of weather, the proper mixing of the material and of the forms and the reinforcement, mean so much that under the very best conditions the contractor has a difficult problem to get his labor to do as he directs.

A report was read at that convention by the chairman of the Committee on Applied Arts and Sciences, Mr. Irving K. Pond of Chicago; Messrs. Claude Bragdon, Elmer Gray, Charles Z. Klander and Bertram G. Goodhue being on the committee. This report defines so well the position of the architect in regard to the use of concrete that I have chosen to read it as giving you an authorized idea of the architect's standpoint.

Although the exact relationship existing between concrete and steel reinforcement under a given condition is yet to be accurately determined,



Chapel at Cypress Lawn Cemetery, San Mateo
T. Paterson Ross, Architect

Hotel Avalon, San Francisco

T. Paterson Ross, Architect *A. W. Burgren, Engineer*

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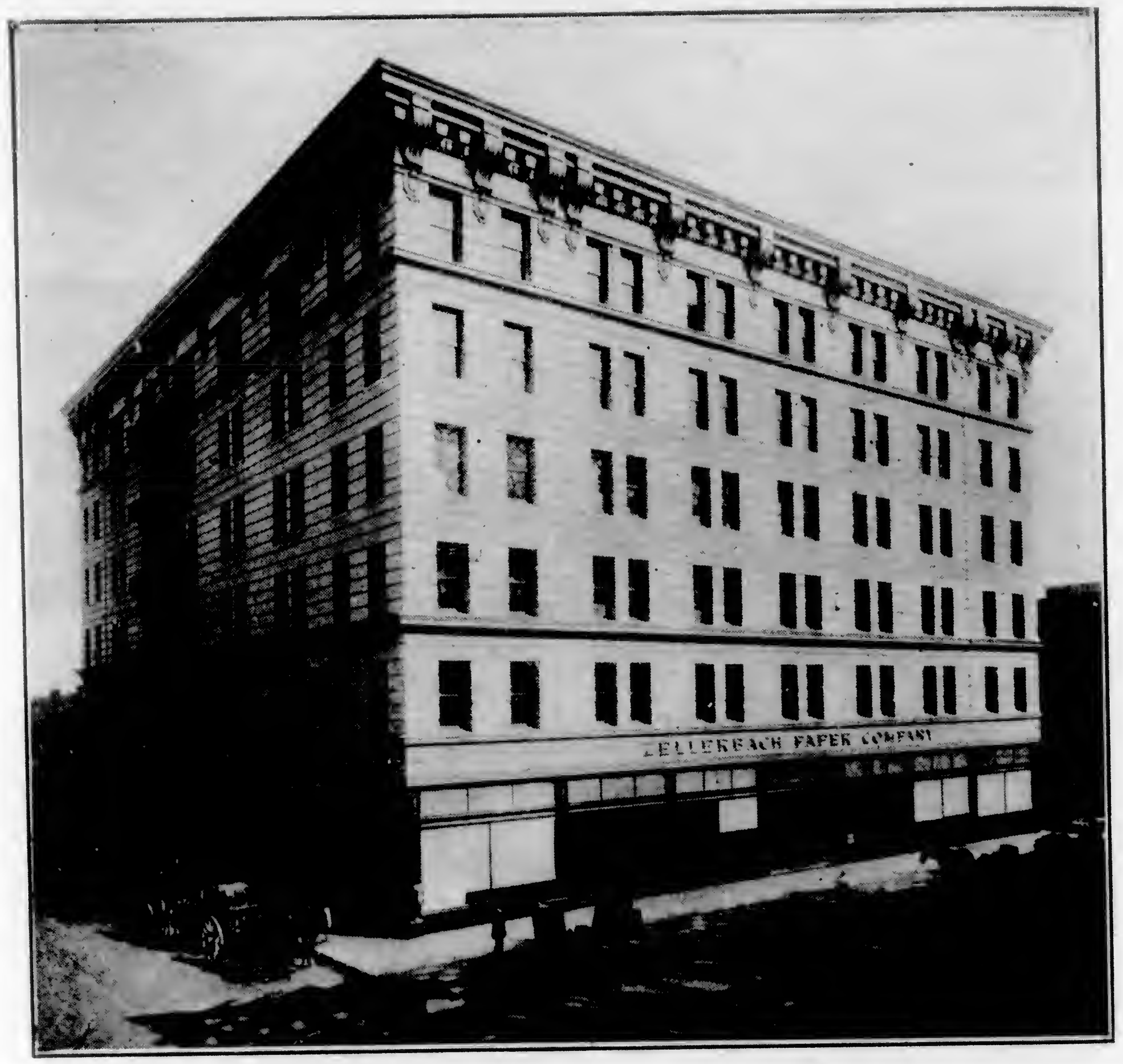
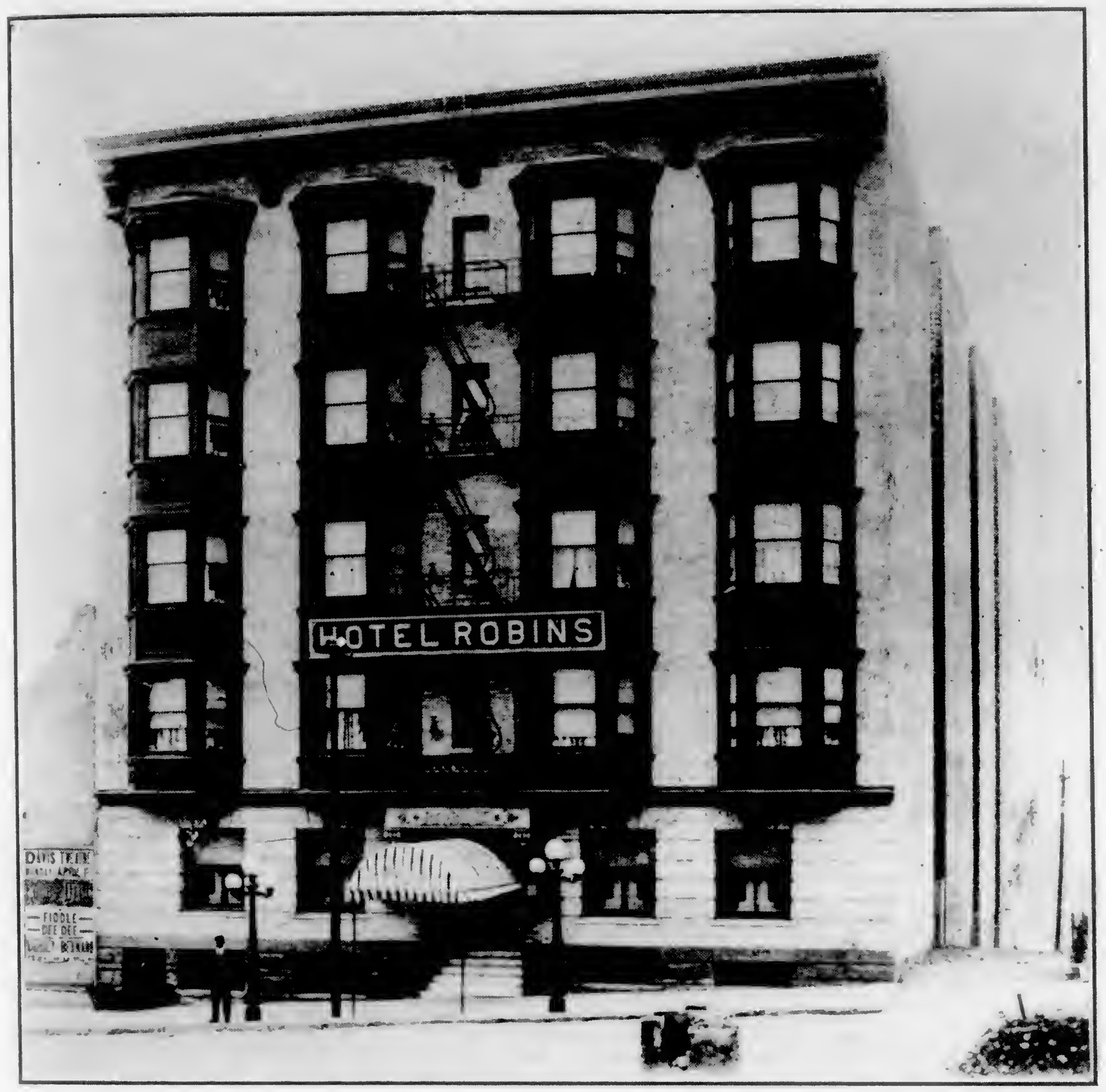


Zellerbach Building, San Francisco. Equipped with two Otis Elevators
T. Paterson Ross, Architect *A. W. Burgren, Engineer*

and the structural use of reinforced concrete is yet to be reduced to an exact science, and although the manipulation of concrete and its application to structural uses has not as yet become an art, yet the fact that in its use and treatment there are immense scientific and esthetic possibilities, brings the subject of reinforced concrete well within the field of study of this committee, especially at this time, when the general topics of steel structure and concrete reinforcement are before the Institute for discussion. It is essential throughout such discussion to keep clearly in mind the true and abiding status of architecture and the architect. The architect is not a mechanical fabricator of mathematical diagrams. His highest concern is with the ideal, and his first sketch should present an idea, an idea which is conceived in beauty. The past has demonstrated that architecture, as the expression of the ideal, can materialize in but one or the other of two great manners; that of the articulated structure, unit added to unit, and that of the plastic mass. The most noble development in the first manner is in the architecture of masonry (brick or stone) and this development has reached its logical limit; in no way, except it may be in mere size, its least noble attribute, is it to be excelled.



T. Paterson Ross, Architect *Hotel Robins, San Francisco* *A. W. Burgren, Engineer*

And now comes the ghost of what might have been, and calls for an incarnation, feeling (if a giant can feel) that in reinforced concrete science is preparing a way which can be vivified with the spirit of art. If this feeling is substantiated, to the architect is opened a new range of possibilities. The architect becomes in a sense a sculptor, a molder of monumental mass; not the fantastic figure who, at first with sharply insistent blows and then with infinite persuasive tappings, releases the form imprisoned in the block, but a creative constructor who builds up his ideal and shapes it by the irresistible though tender molding of mass and form.

The masonry-clad steel structure of today is an architectural anomaly, representing as it does rather a branch of engineering than of architecture; and it is doubtful if any treatment of the encrusting material, be it brick, stone or terra cotta, can make the structure architecturally interesting as compared, for instance, with the interest which attaches to a well-designed brick cottage or stable, even. The steel structure, however, will continue to occupy its own domain. But the call of concrete is heard inviting architecture to occupy an as yet undeveloped territory.

Though the use of concrete goes back to antiquity, plastic architecture would seem to be in the veriest infancy, and would seem also to be asking the genius of this age to give it perfect expression and make it worthy to stand with the architecture of the past and yet-to-come. Though the past be examined for precedent, little will be found. Rome used concrete in bulk—but undeniable evidence of a scientific use of the matrial is wanting.

ZELLERBACH PAPER COMPANY

Zellerbach Building, San Francisco. Equipped with two Otis Elevators
T. Paterson Ross, Architect *A. W. Burgren, Engineer*

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HOTEL ROBINS

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Musto Flats. San Francisco

T. Paterson Ross. Architect A. W. Burgren. Engineer

Rome employed masonry in bulk—but again evidence of a scientific use is wanting. Rome applied superficially the arts of other times and countries, but of itself left to posterity only monuments expressive of a highly temperamental force, breathing little or nothing of spirituality. The Spanish missions were built with a rare feeling for mass and light and shade; but feeling swayed and science did not guide. With the science of today to guide, and the art experience of the past to illuminate, into what logical, noble and beautiful forms should not concrete shape itself, to the end of an enduring, spiritualized architecture?

In this study your committee has taken no cognizance of the concrete block as a structural possibility, believing that such blocks, as well as the terra cotta used in the same manner, are mere imitations of stone, and when used after the manner of stone, are impossible in the architecture of sentiment, and, like all imitations of one material in another, are inimical to art.

The possibilities, even the esthetic possibilities, within the range of reinforced concrete construction, can hardly be over-estimated. Little beyond the introductory chapter has been written in the history of reinforced concrete, and every advance in the science of its manufacture and use will signal an advance along the line of artistic application.

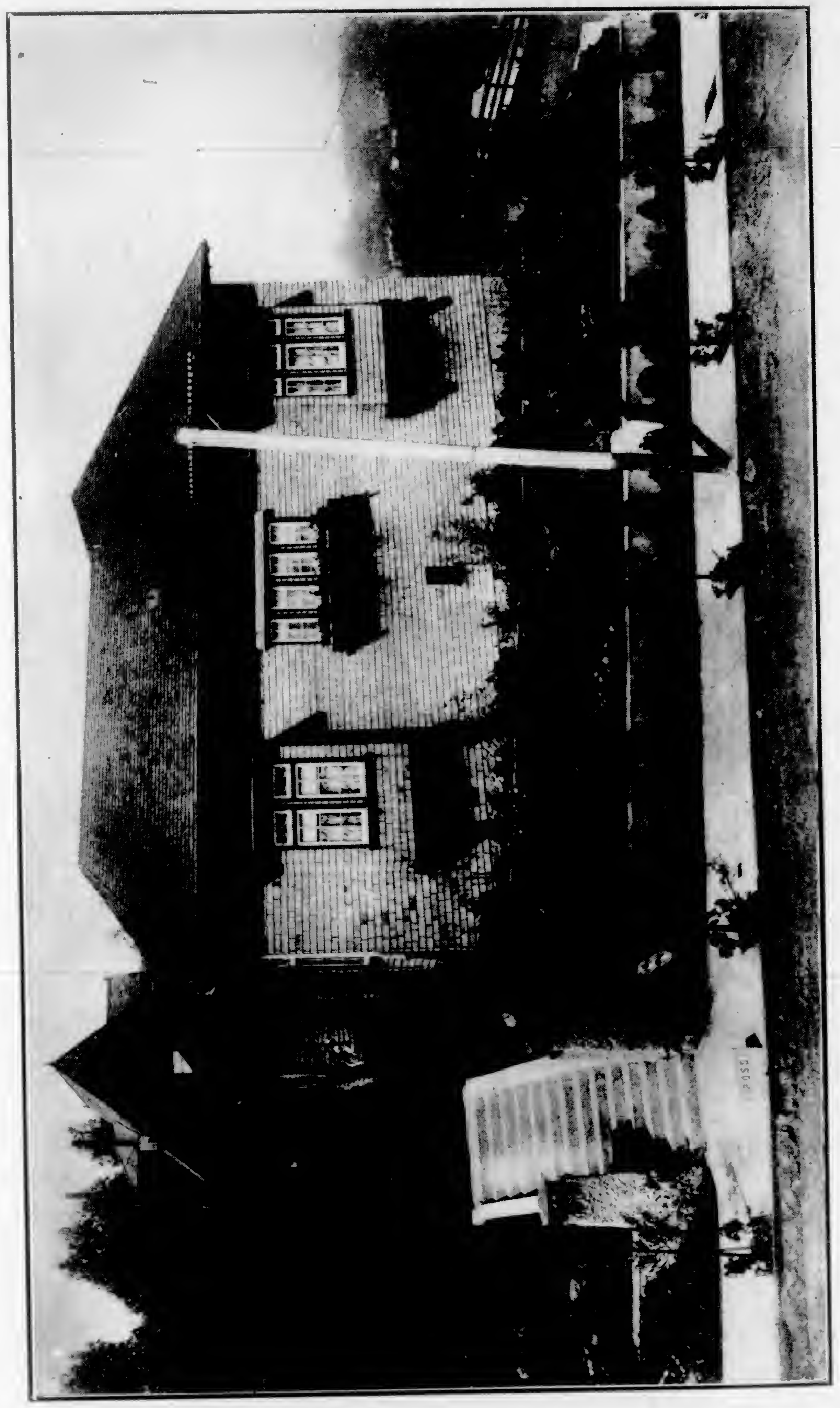
Except in well-defined types, designed to serve certain well-defined uses, it is impracticable so to carry masonry construction beyond and behind the facade as to result in a homogeneous structure—wanting which architecture becomes but a hollow sound. The architecture of a reinforced plastic material may and logically will express itself throughout the entire structure to the remotest core. The unity, the truth, the harmony of the whole may in every part be manifested. Therefore, again the possibilities inherent in concrete present themselves alluringly to the architect to whom the art means as much as does the science of building.

The architectural brain is not so congested by the weight of pregnant thought that at a blow a Minerva shall issue forth, full fledged and full armed. That is not the history of the evolution of an architectural style. It will take time and struggle and developed artistic perceptions in this, as in former cases, to reveal the possibilities of beautiful and of monumental design.

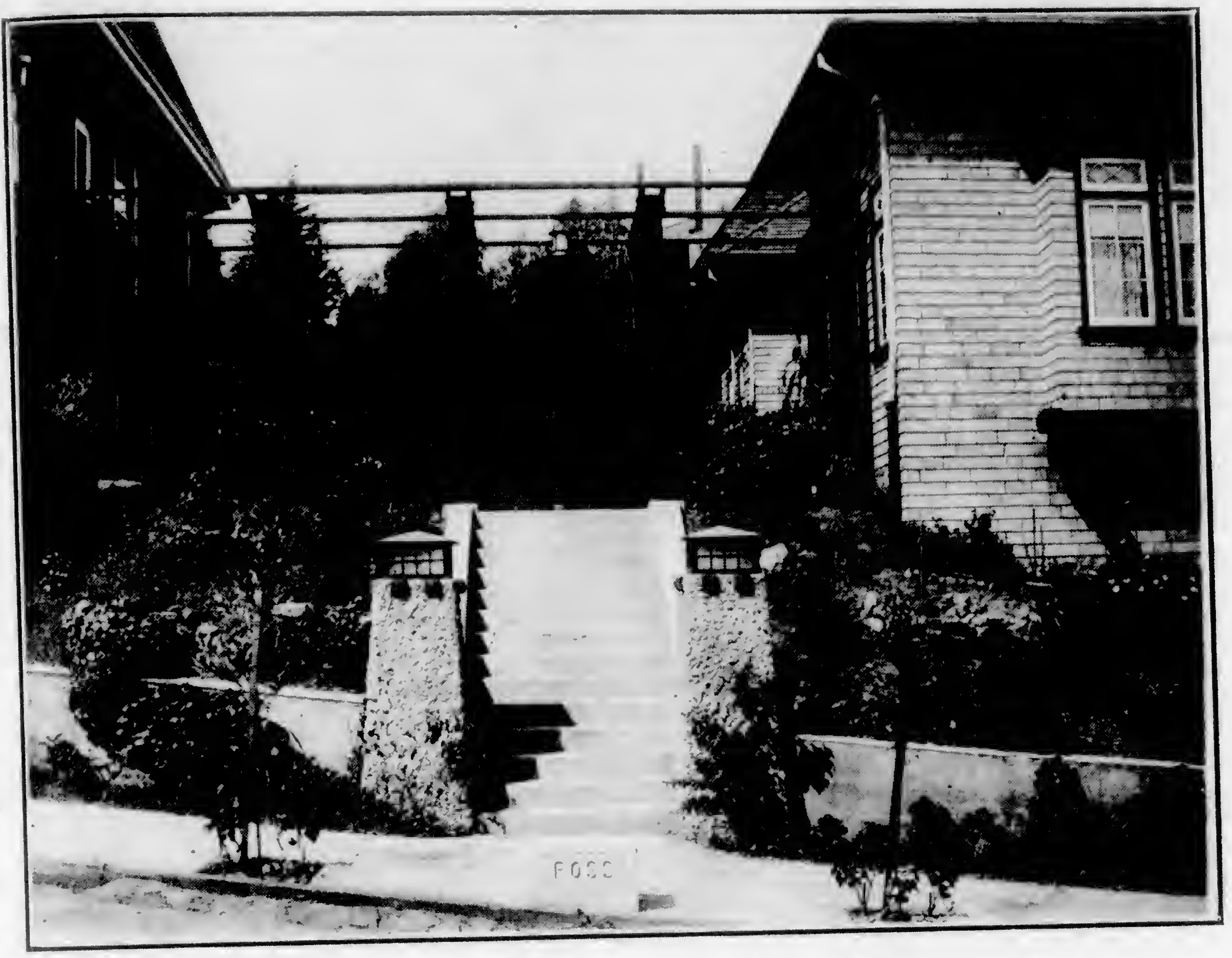
Yet it is possible that in this, as in other ages, commercialism, itself so devoid of esthetic tendencies, will pave the way to the realization of an esthetic ideal. A material which holds in itself the qualifications for commercial use will in that very use reveal its esthetic possibilities. No material which puts into the hand of the architect power to reduce permanent mass and form, and add the enrichment of light and shade, color and texture, will be ignored long when science has made its use commercially possible. It would then seemingly remain only for science to demonstate the practical value of reinforced concrete, in respect to its physical properties, and art must unfold whatever it holds of beauty.

The steel skeleton developed from commercial necessity, and to clothe and perfect that skeleton, the architect, naturally, used whatever means lay at his command; stone, brick, terra cotta and metal were called into requisition. To clothe the skeleton in one or another or all of these materials became a fixed habit with the architect. So that when concrete came into use not only was it ignored as a possible clothing for steel, but when the skeleton of reinforced concrete was set up, it was itself clothed after the existing fashion for steel. Such is the fatal force of habit. Granting to concrete the qualities ascribed to it, that it is fireproof, that it may be rendered moisture proof, that once in place it is not affected by atmospheric and climatic conditions, that it can be permanently colored, can be molded and chiseled, that it can be formed in place and need not be applied piecemeal—what better material could be sought for clothing the steel skeleton? And why the need of any cloak at all to such material, when it has been treated with any manner of decency or respect by the designer? So esthetically there would seem to be unlimited possibilities in reinforced concrete.

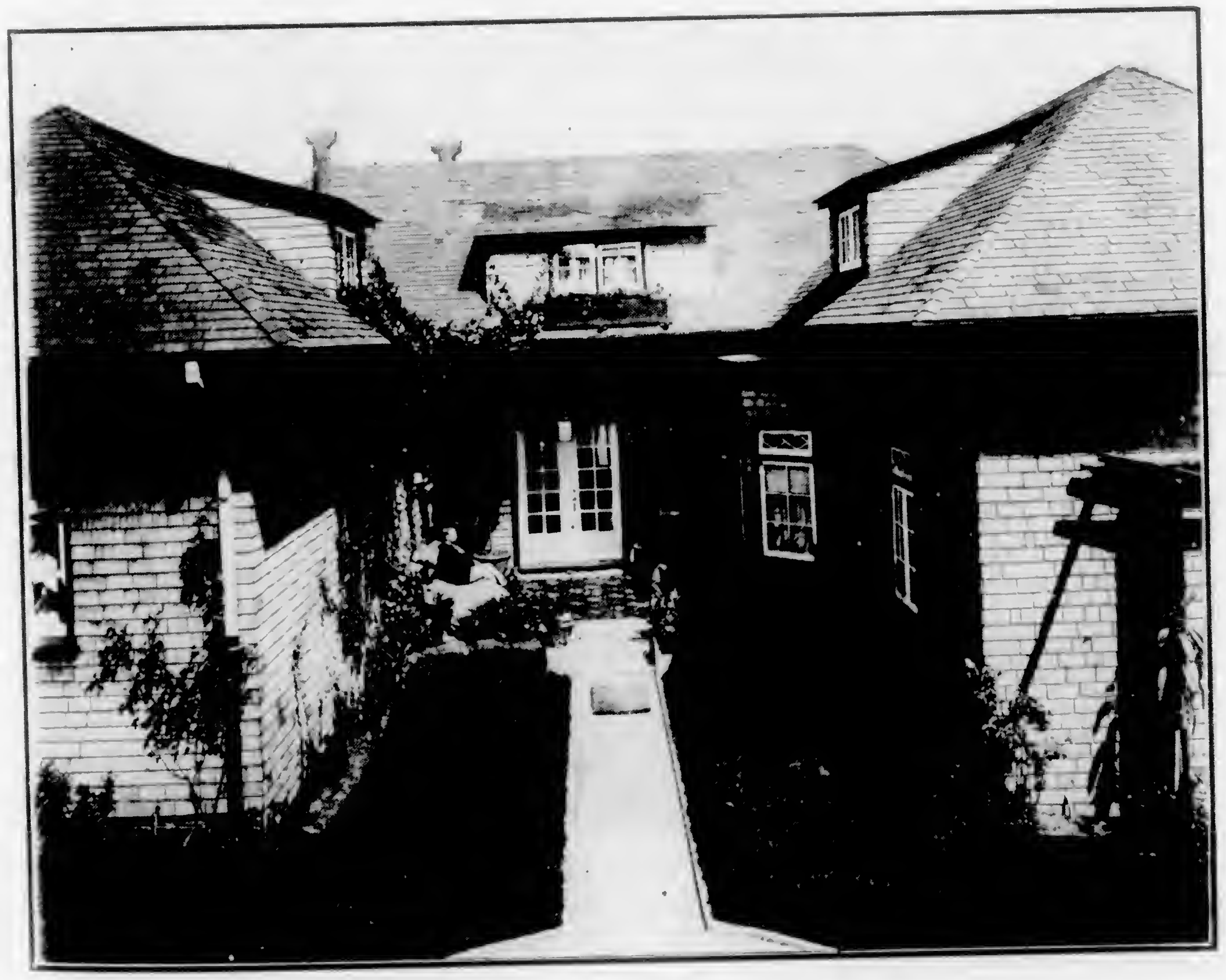
Although it has not been its purpose to study that especial phase, it seems to your committee that the esthetic possibilities inherent in terra cotta and faience as covering materials for the steel skeleton have not as yet been in the highest degree realized, while, as stated before, concrete as a possible covering has been ignored. Simultaneously with their development in the field already assigned to them, it is not inconceivable that ornamental terra cotta and tile beautiful in color and texture, and also sculptured stone, will be called upon to embellish and distinguish, though not in any manner to clothe or conceal the concrete structure. The presence of these materials may be needed as a saving grace in these early days of design in concrete, to save the designers from a too brutal conception of the forms they deem the material must necessarily take. There is an unfortunate though marked tendency now in what should be a refined and restrained domestic architecture to shape concrete, and its lath and plaster imitations, into the crude though characteristic forms of the old mission work. It is needless to say that these forms have no meaning outside of their original environment, and would not have existed there but for the exigencies of the case—the crude nature of the materials procurable and the absence of all skilled labor.



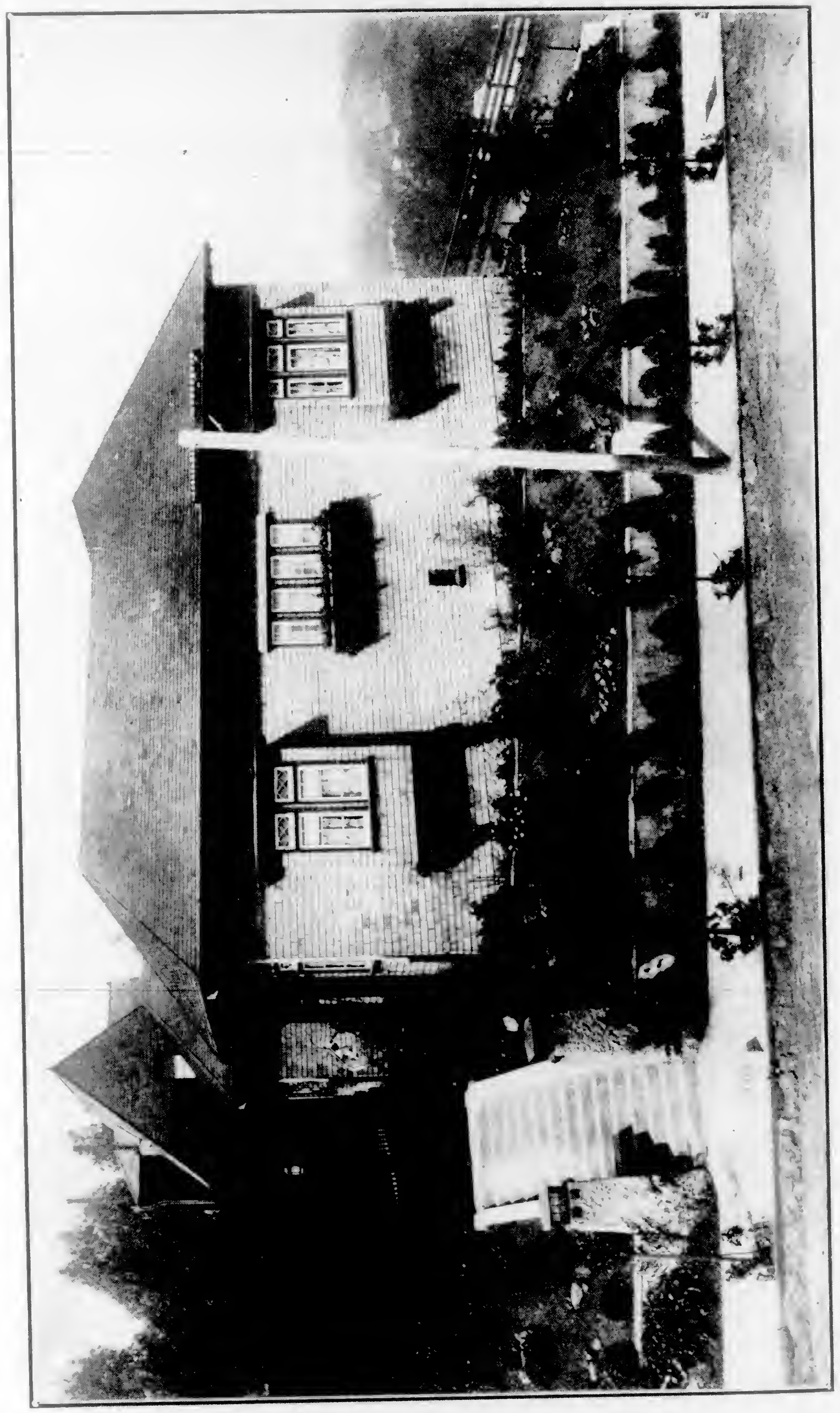
Bungalow of T. Paterson Ross, Architect, Looking East from Sunset Avenue, San Francisco



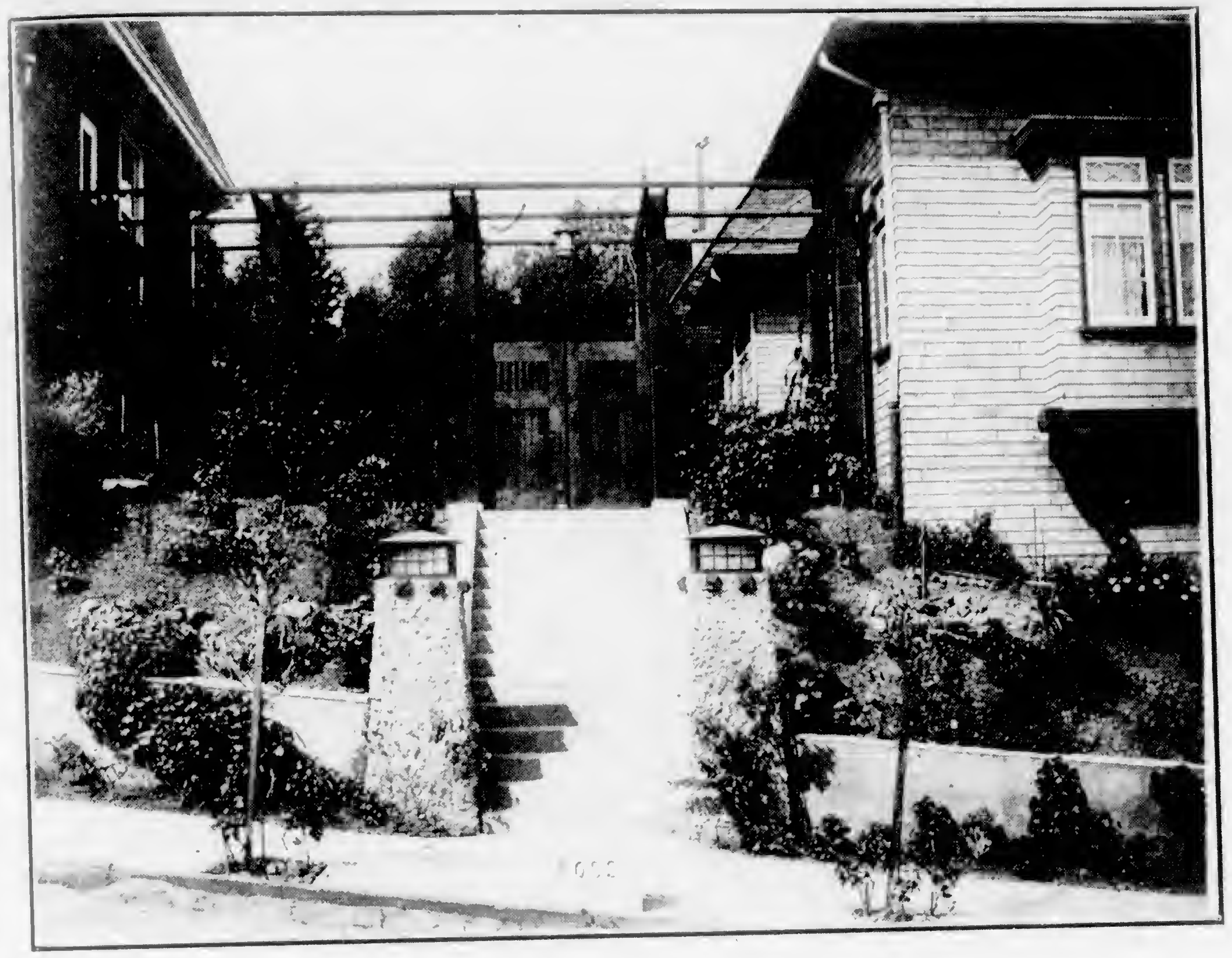
Entrance to Bungalow of T. Paterson Ross, Architect



Court to Bungalow of T. Paterson Ross Architect



Bungalow of T. Paterson Ross, Architect, Looking East from Sunset Avenue, San Francisco



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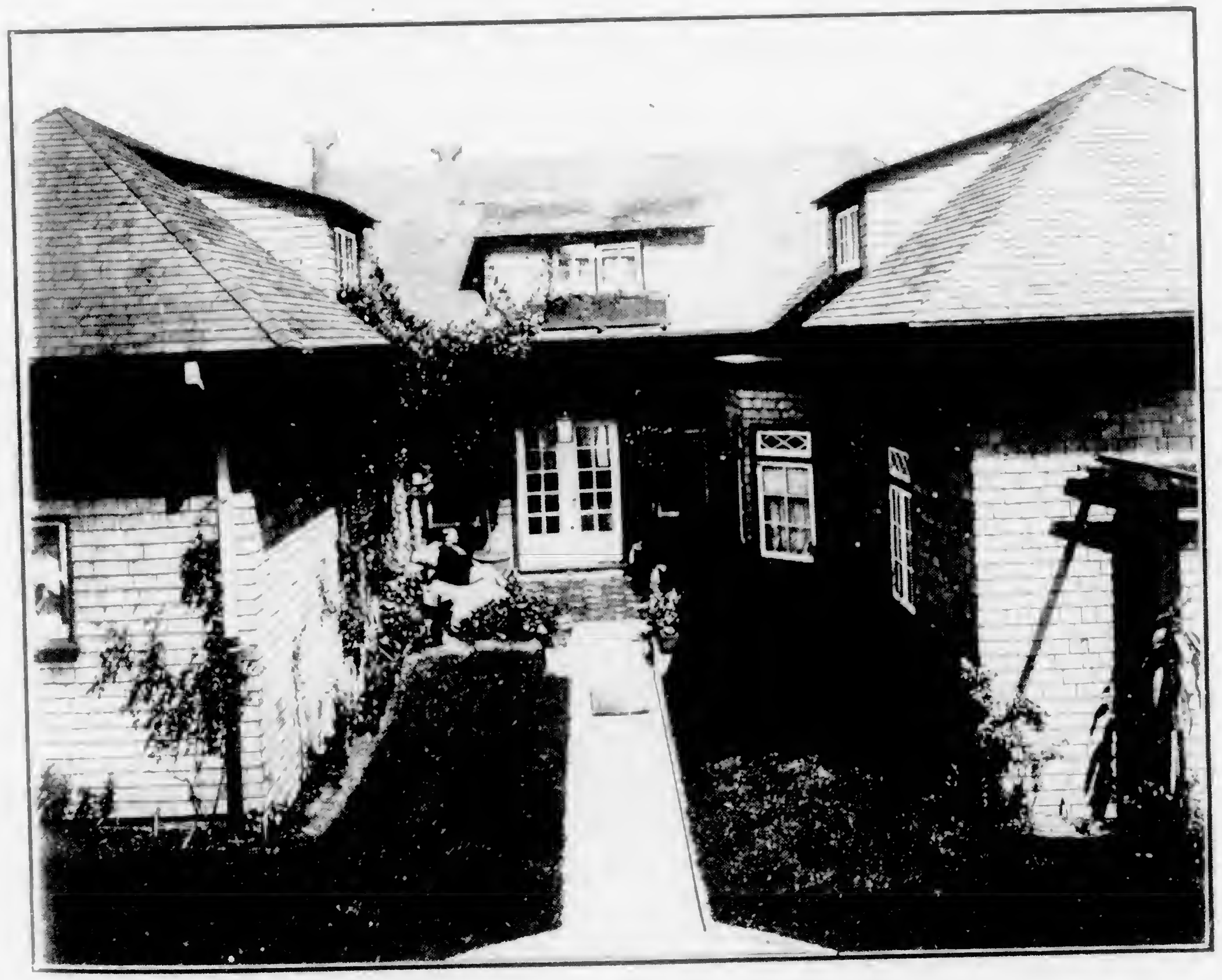

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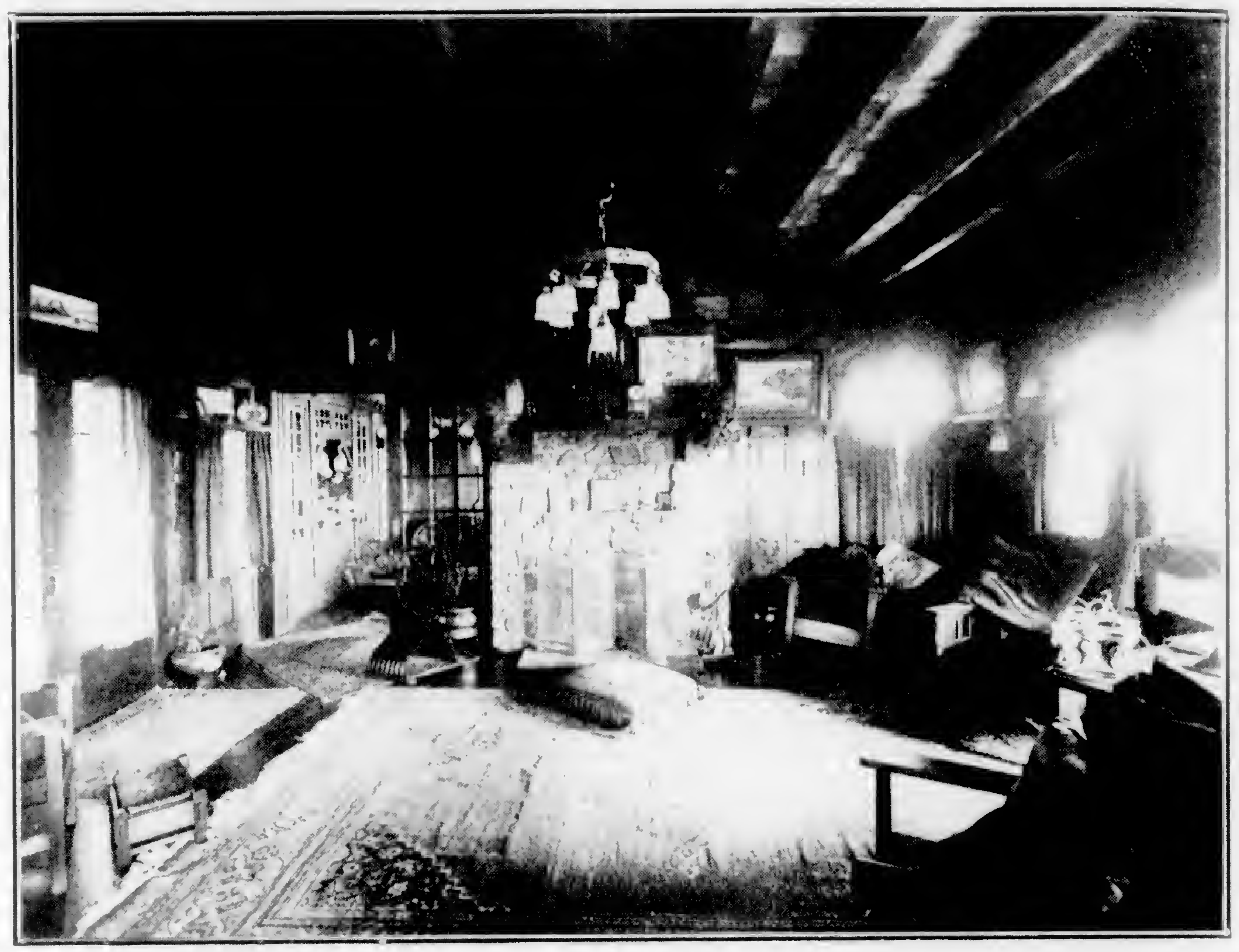
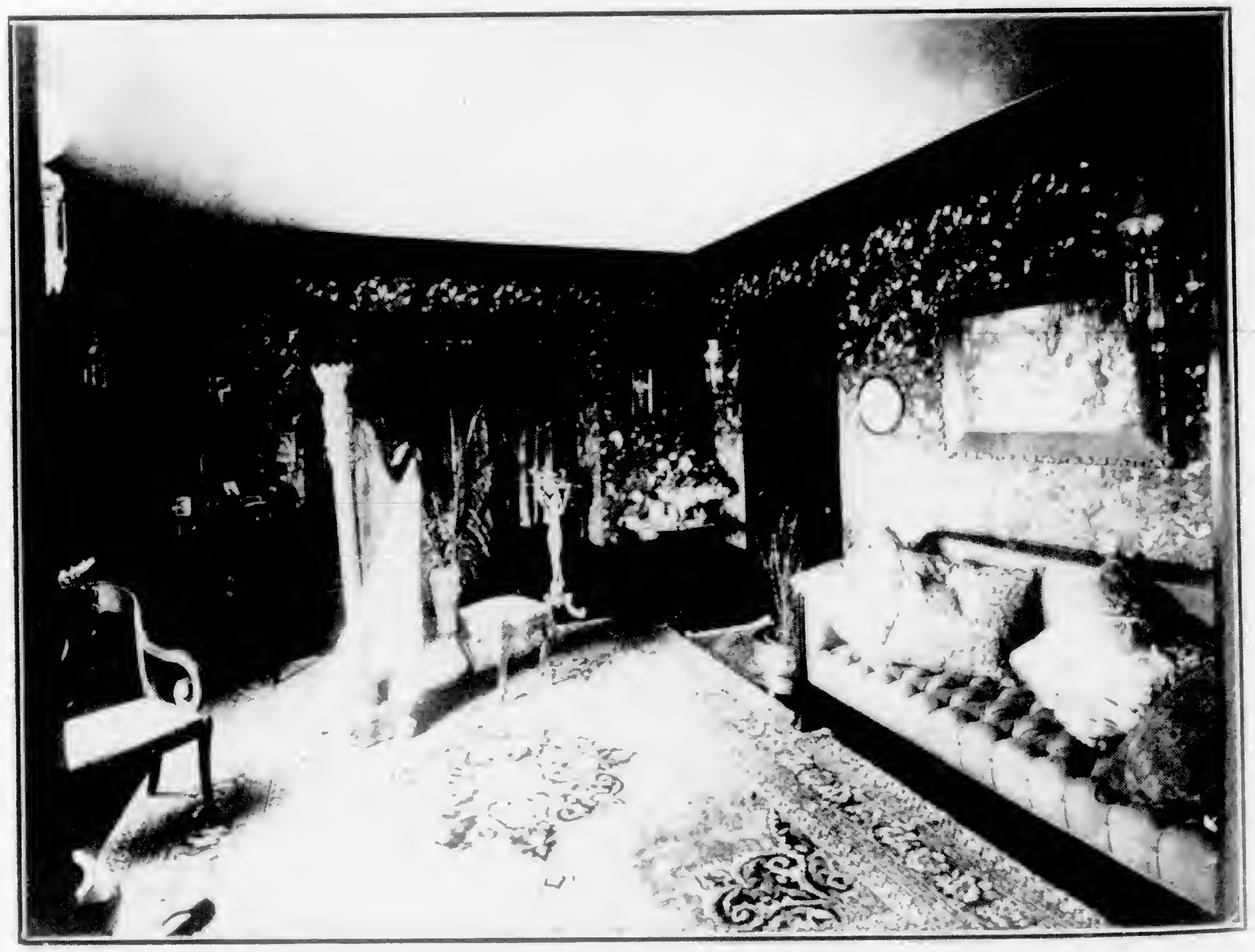
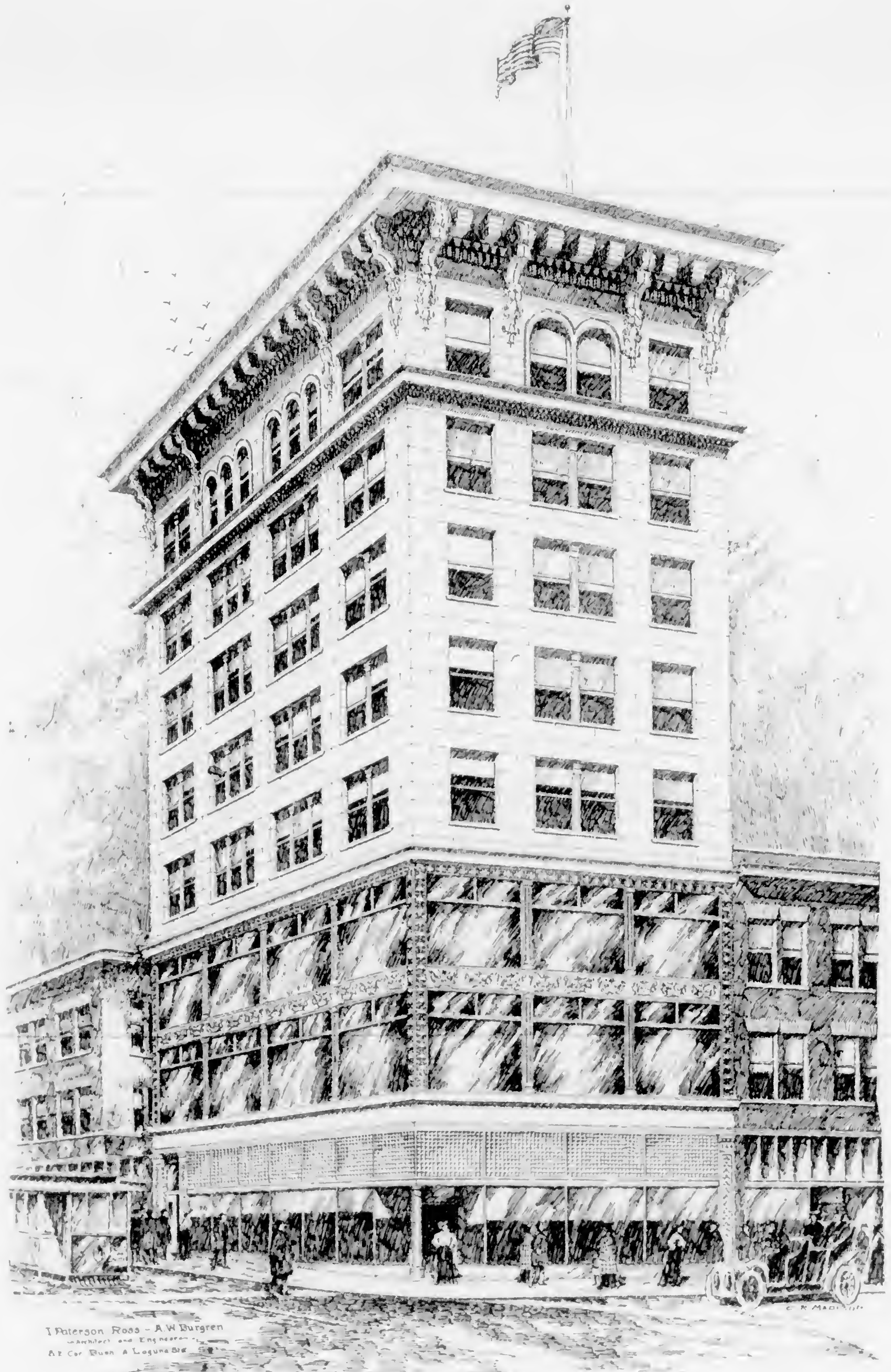


Living Room in Bungalow of T. Paterson Ross, Architect

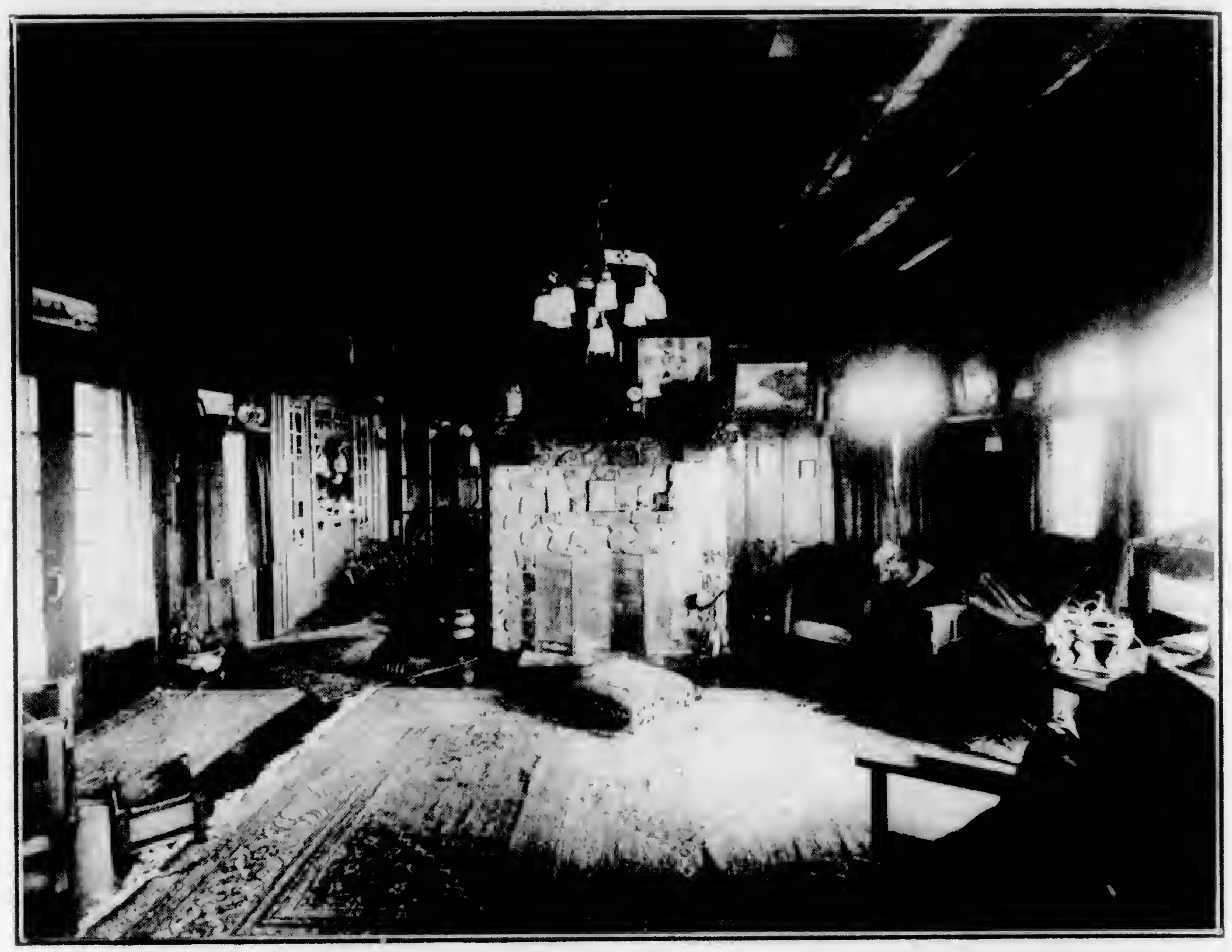


Music Room in Bungalow of T. Paterson Ross, Architect

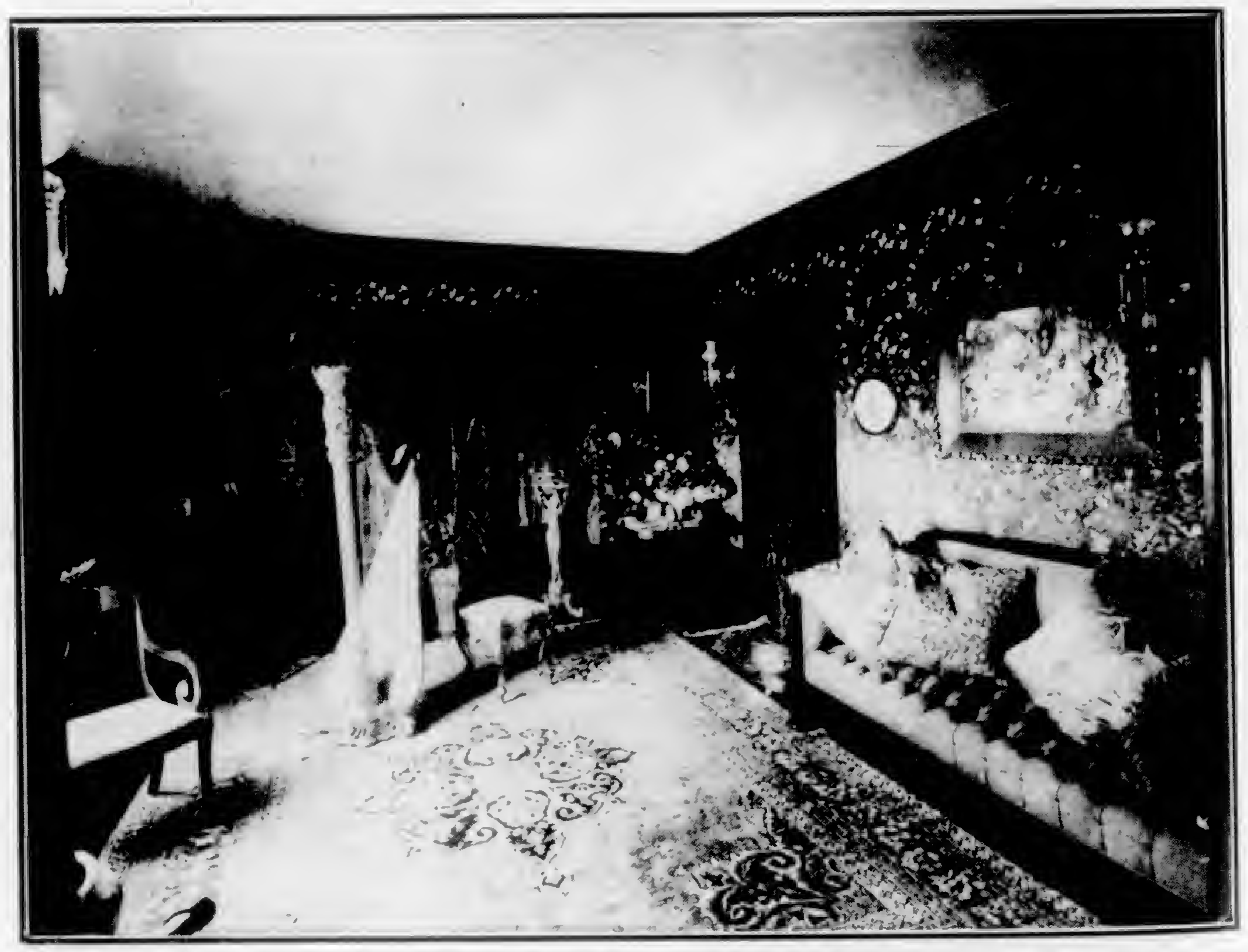

T Paterson Ross - A.W. Burgren
Architect and Engineers
N E Cor Bush & Laguna Sts

The Burke and Tobelman Building, San Francisco

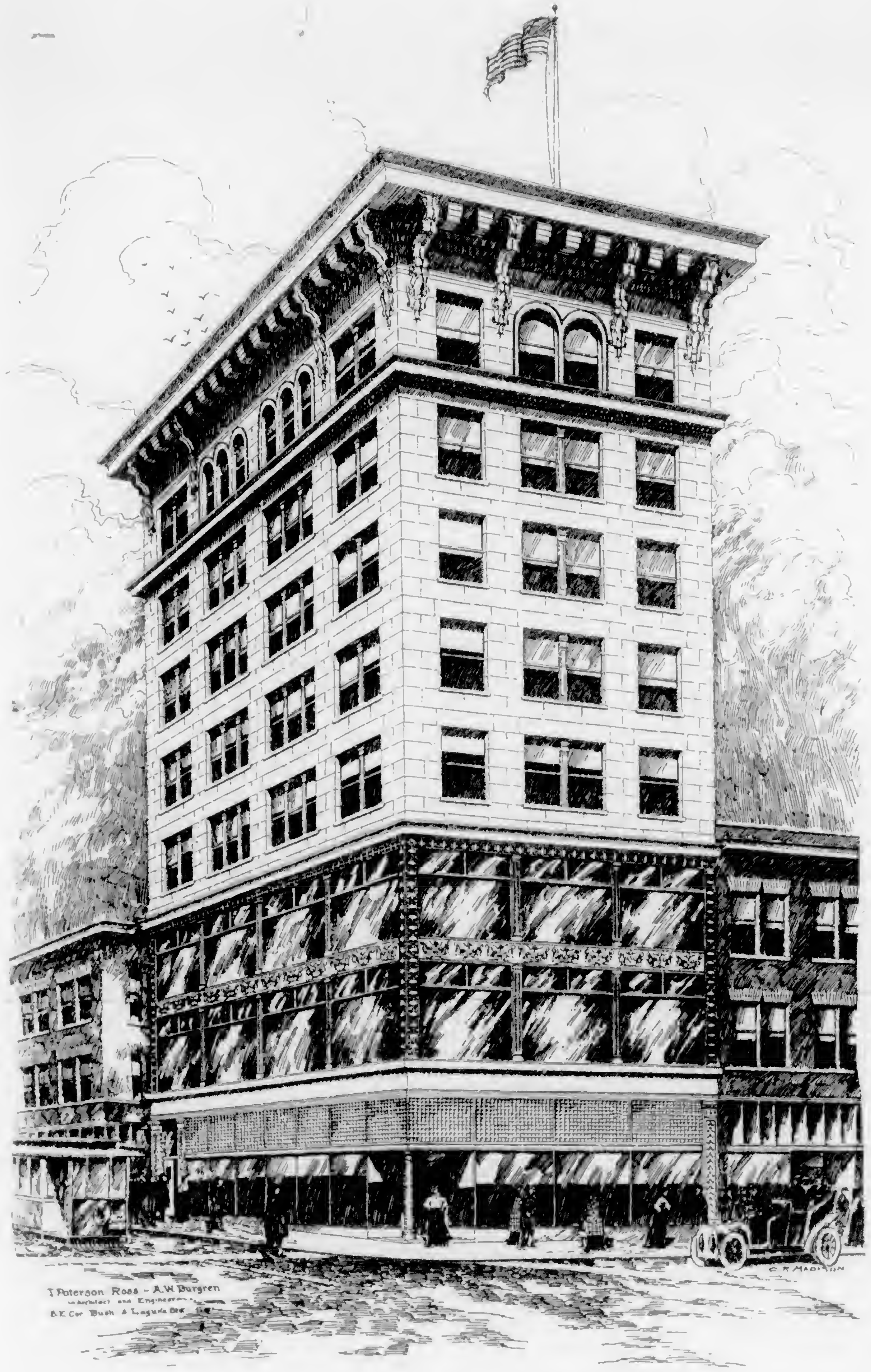
T. Paterson Ross, Architect *A. W. Burgren, Engineer*



Living Room in Bungalow of T. Paterson Ross, Architect



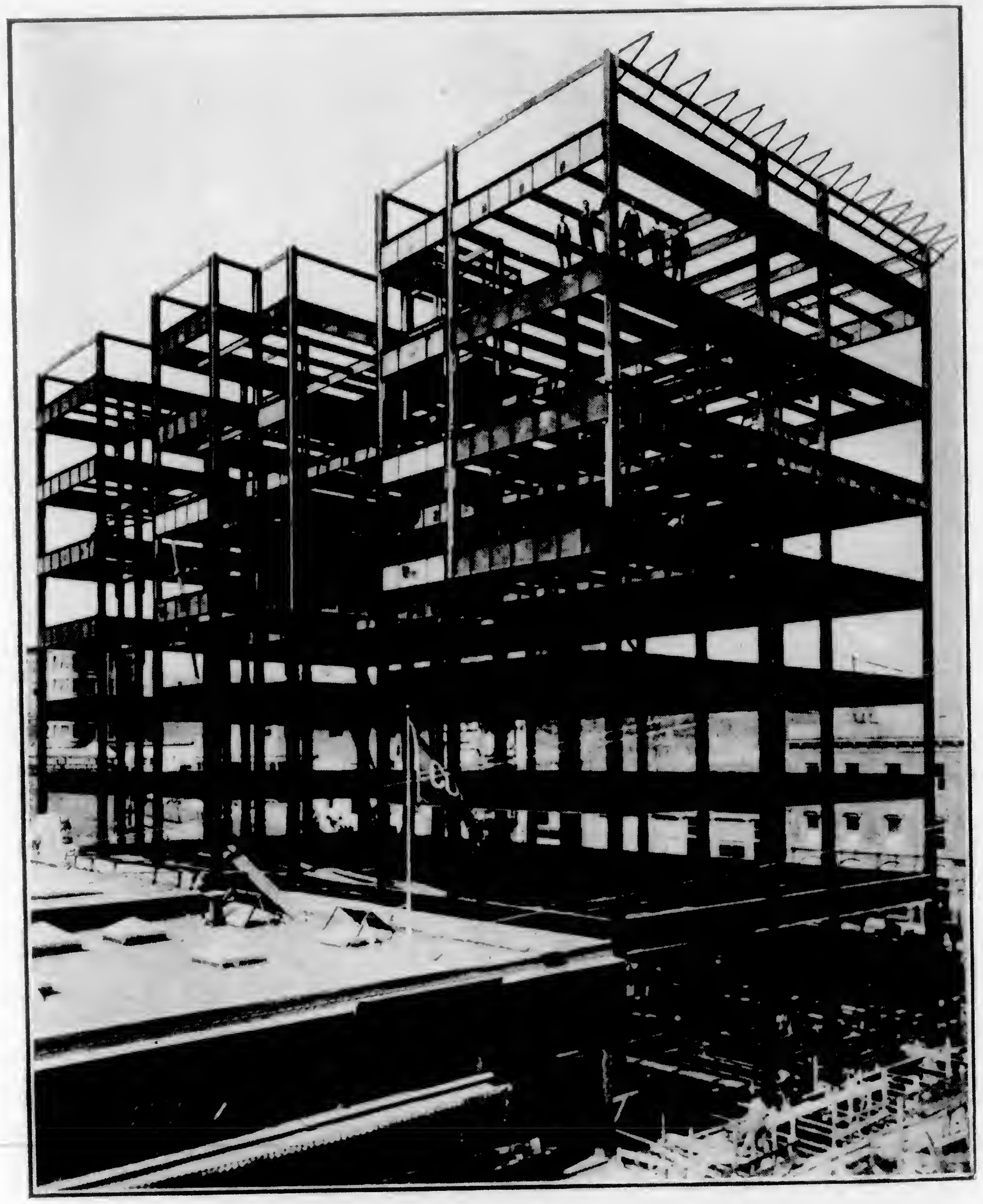
Music Room in Bungalow of T. Paterson Ross, Architect



T Paterson Ross - A.W Burgren
Architect and Engineer
S.E. Cor Bush & Laguna Sts
C. K. MADISON

The Burke and Tobelman Building, San Francisco

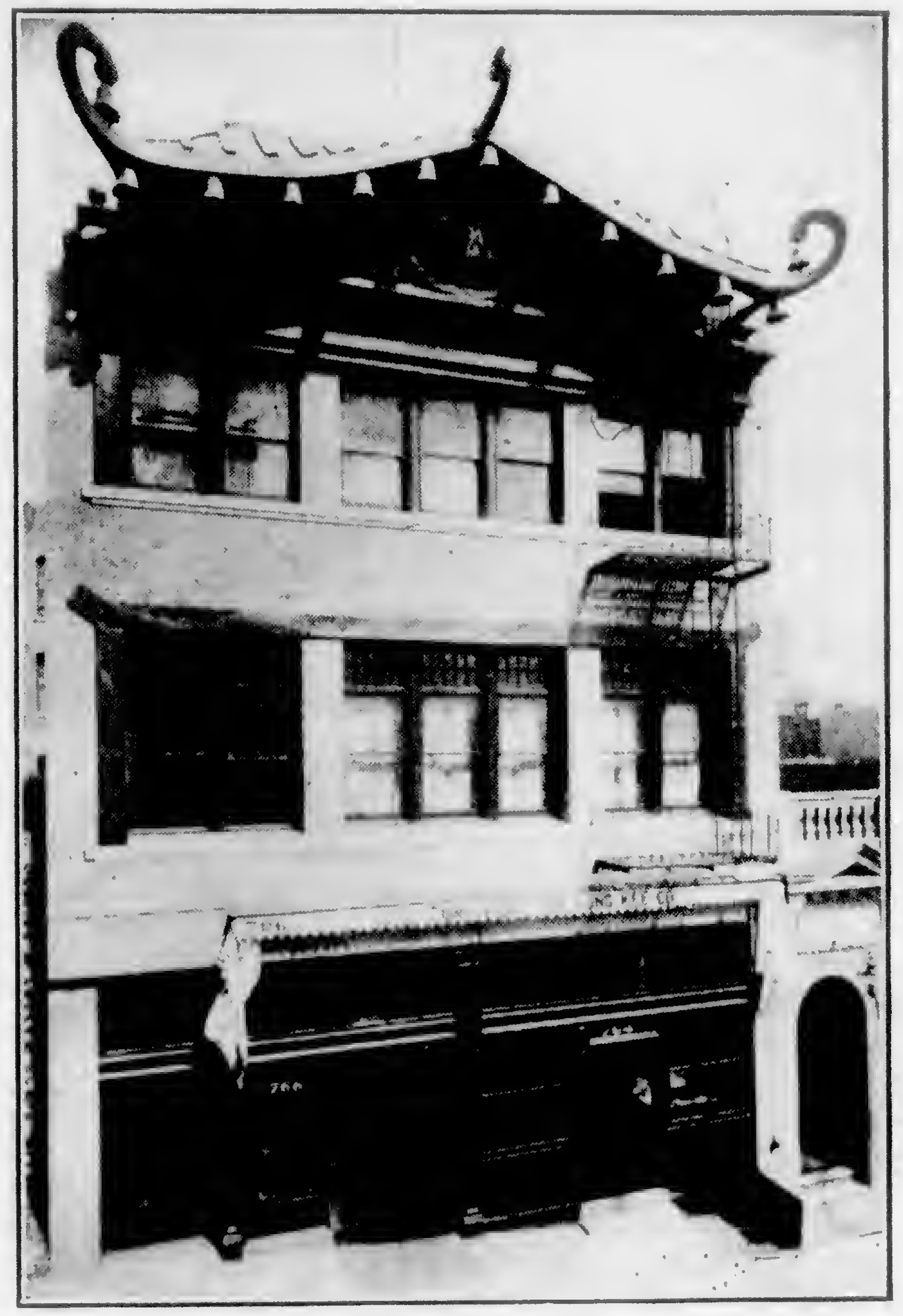
T. Paterson Ross, Architect A. W. Burgren, Engineer



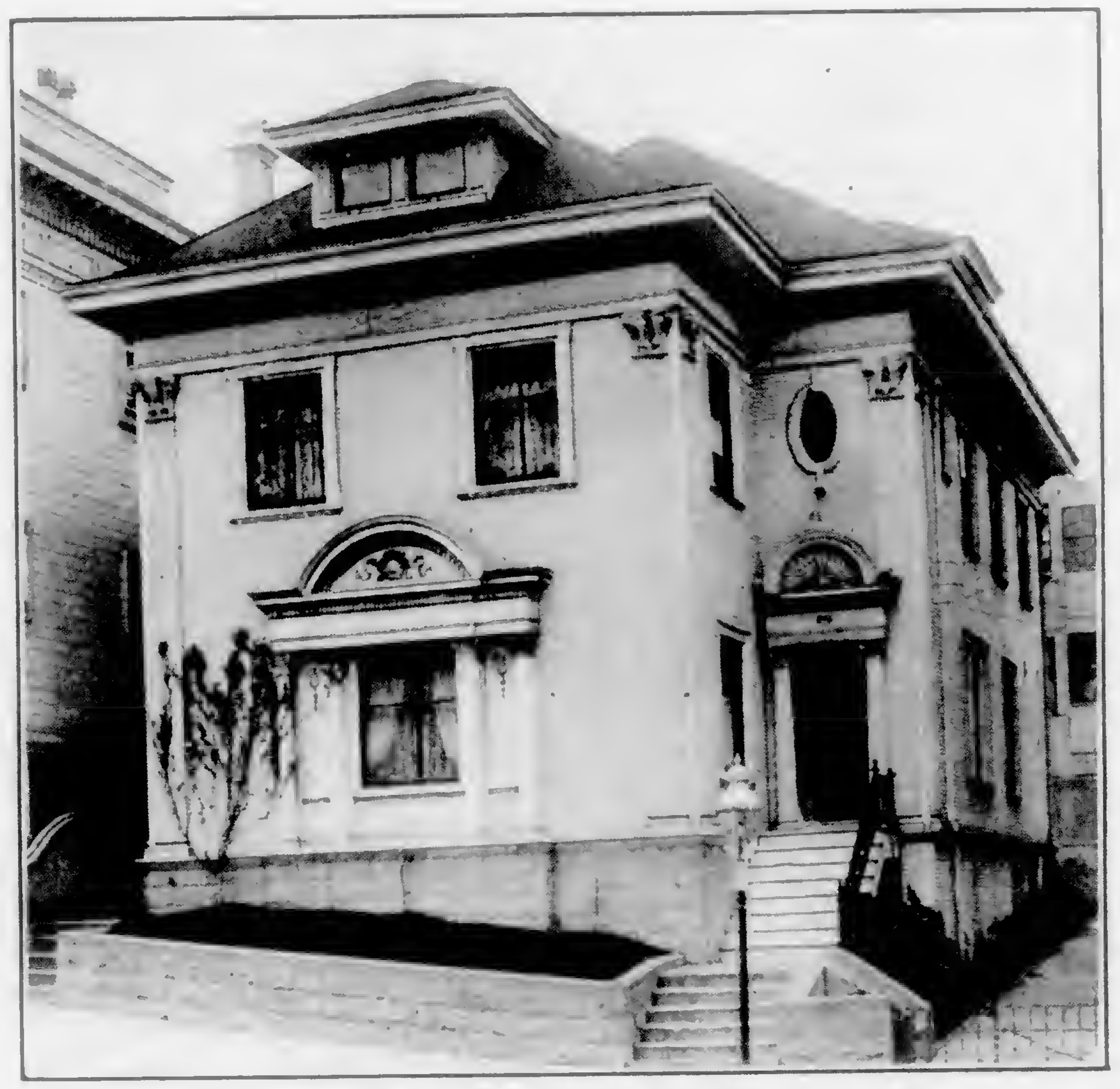
Steel Frame of Clunie Building, San Francisco
Steel Fabricated by Whitehead & Kales Iron Works, San Francisco and Detroit Mich.
Steel Erection by C. A. Blume

Cleaning Paper on Ceilings

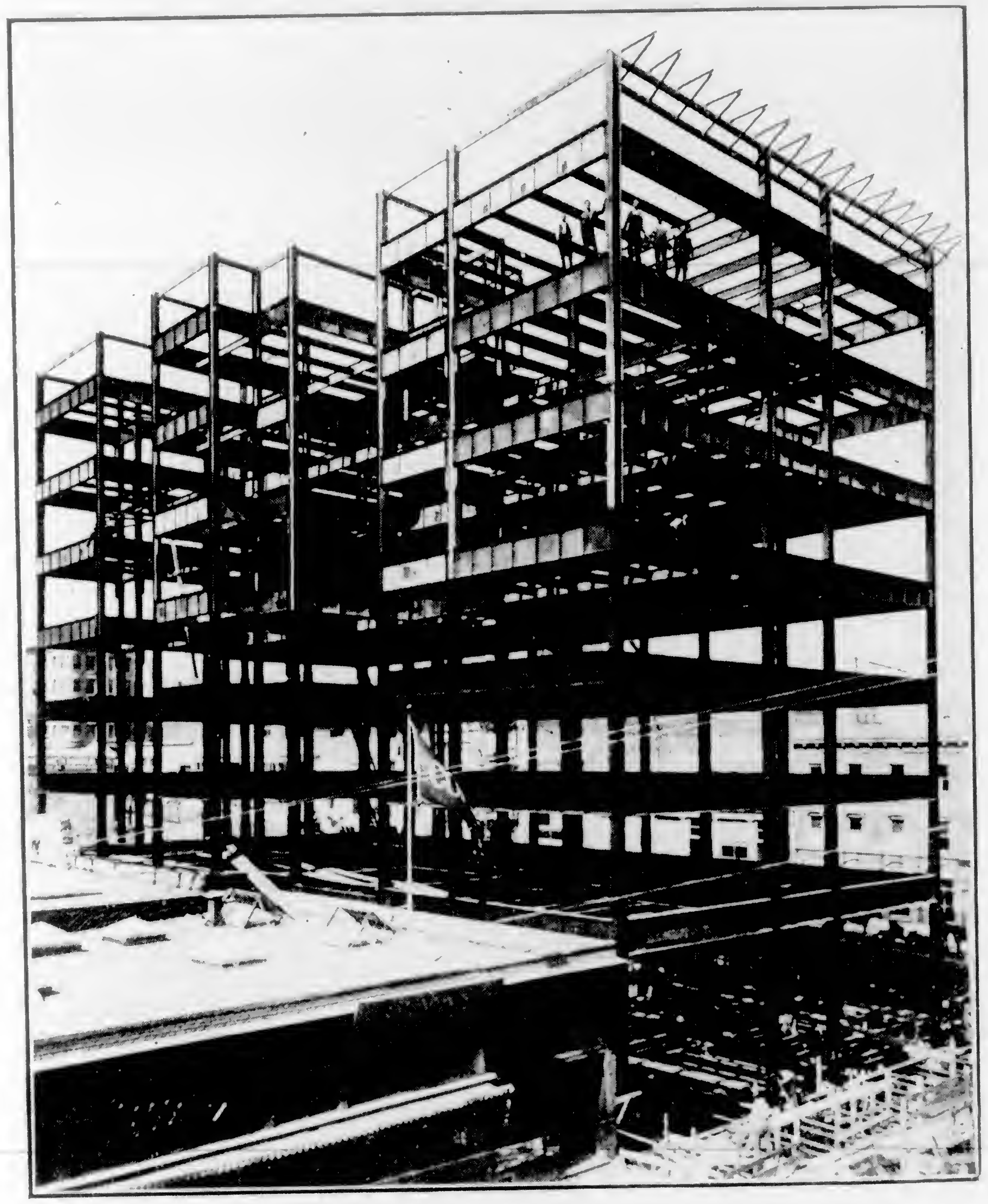
While there are some preparations for cleaning wall paper on the market, they are not always readily obtainable in every locality. The simplest way to clean wall or ceiling paper is to make a bag of coarse flannel, in which tie or sew up two quarts of wheat bran, rubbing the same over the paper briskly, all in one direction, taking care not to miss a single spot. Before beginning to rub, however, the walls or ceiling must be carefully dusted.



Six Companies Building, Chinatown, San Francisco
T. Paterson Ross, Architect *A. W. Burgren, Engineer*



Scobie Residence, San Francisco
T. Paterson Ross, Architect *A. W. Burgren, Engineer*



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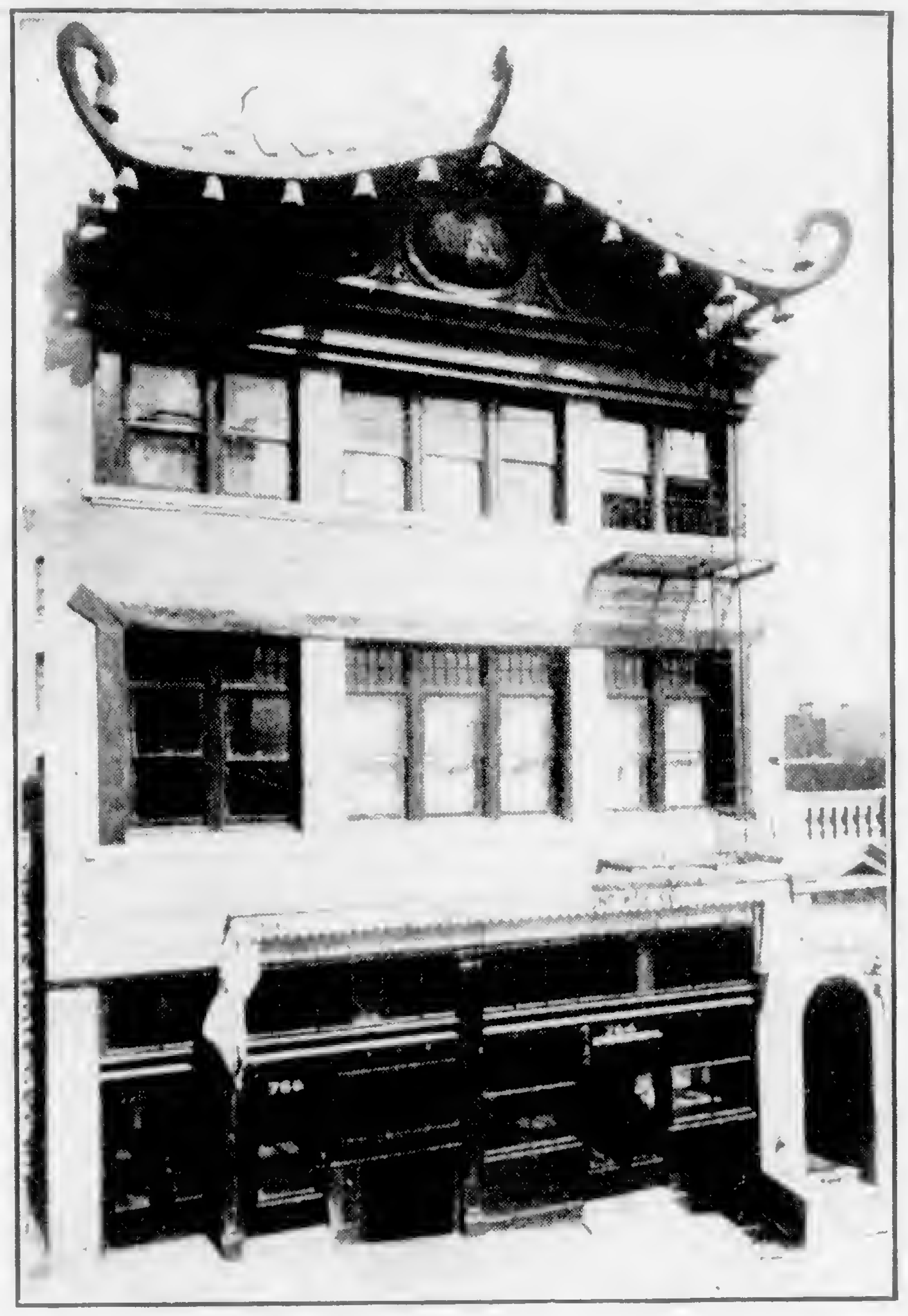
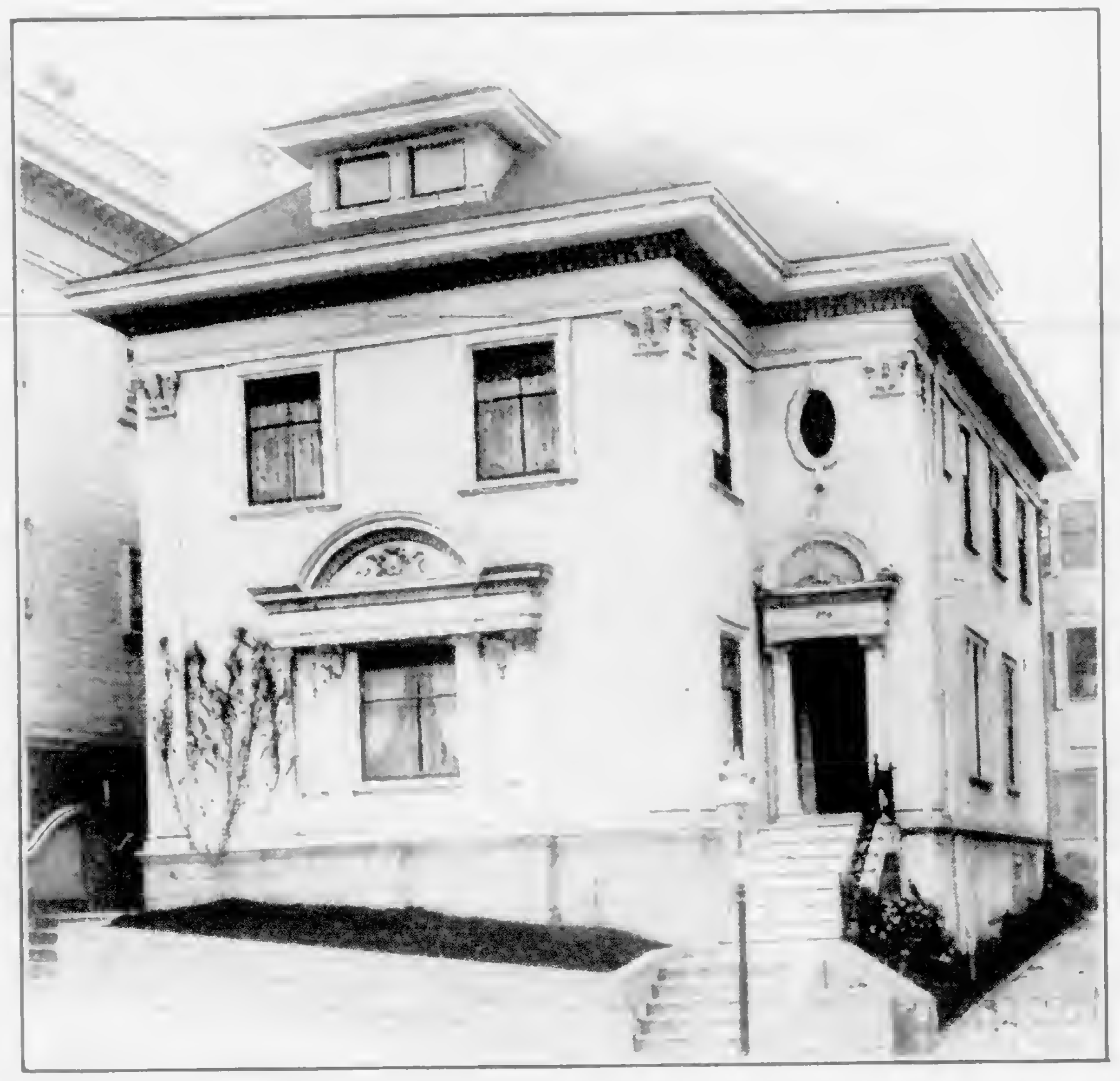
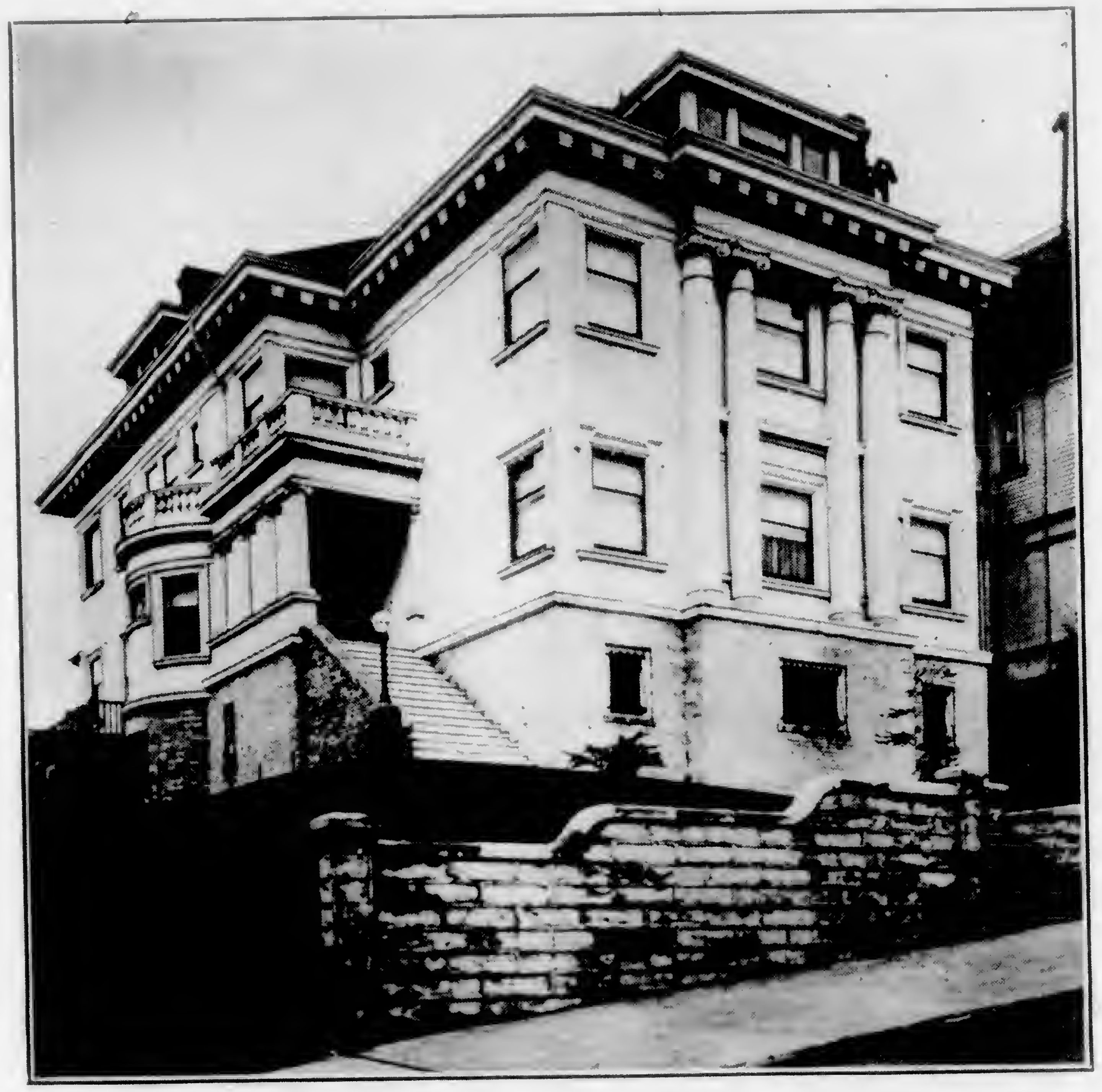


Six Companies Building, Chinatown, San Francisco
T. Paterson Ross, Architect A. W. Burgren, Engineer



Scobie Residence, San Francisco
T. Paterson Ross, Architect A. W. Burgren, Engineer



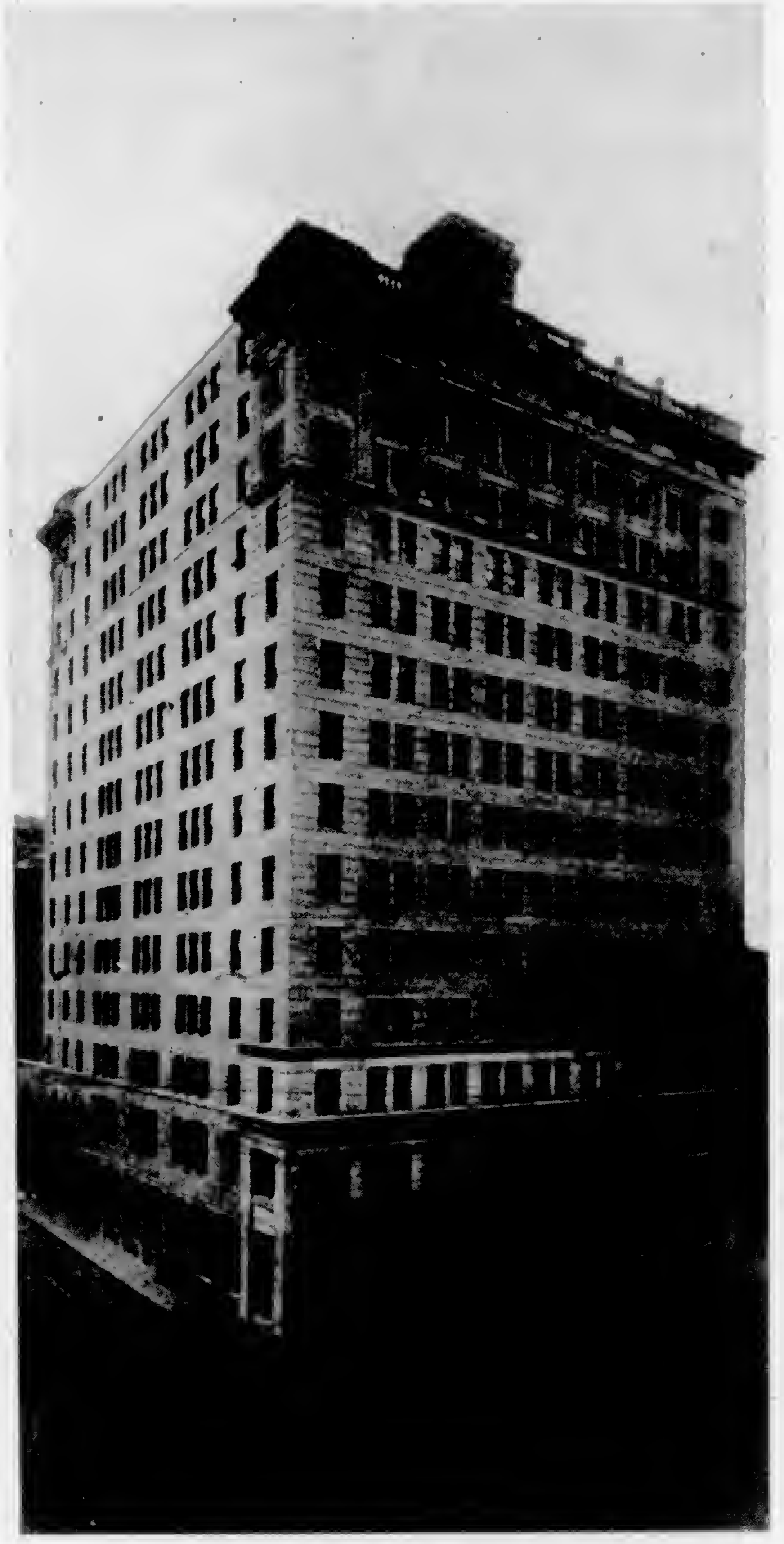
House of Mr. A. J. Raisch, San Francisco
T. Paterson Ross, Architect A. W. Burgren, Engineer

Avoid Violent Contrasts in Wall Paper

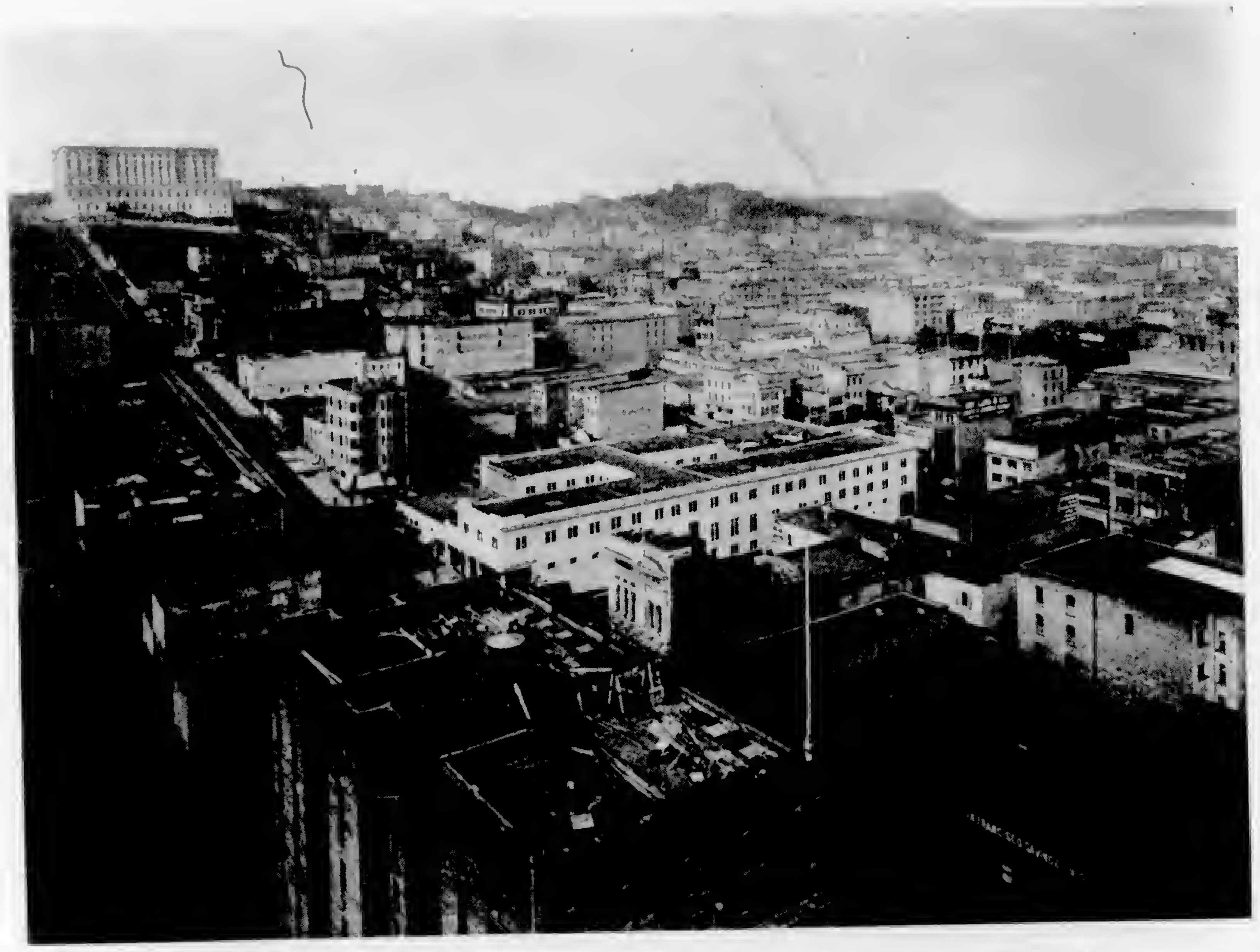
IN SELECTING wall paper for a room, violent contrasts should be avoided. If the woodwork is light in color, the paper should also be light; if the woodwork is dark, the paper should be dark, and the hue of the paper should not be too far away from the hue of the woodwork. If a room is too low, the defect can be modified by vertical stripes in the paper. If it is too high, a picture frieze will bring the ceiling down. Relief ornament on the ceiling will do the same, and it may be accepted as a general principle that plain, light walls tend to recede, while dark patterned walls advance and make the interior seem smaller. If a room is very wide and low, the ceiling should be left plain and finished in ivory; the side-walls should be hung with small-figured all-over paper, and if paneled, the panels should be narrow, as should the doors and windows. To select a paper merely because it strikes the eye or because the woman's department of the Daily Nonsense says that "Marie Antoinette ribbon effects are much in vogue this season" is foolish. The room should first be considered in detail and the paper chosen that will cure its faults and increase its beauties

San Francisco To-Day

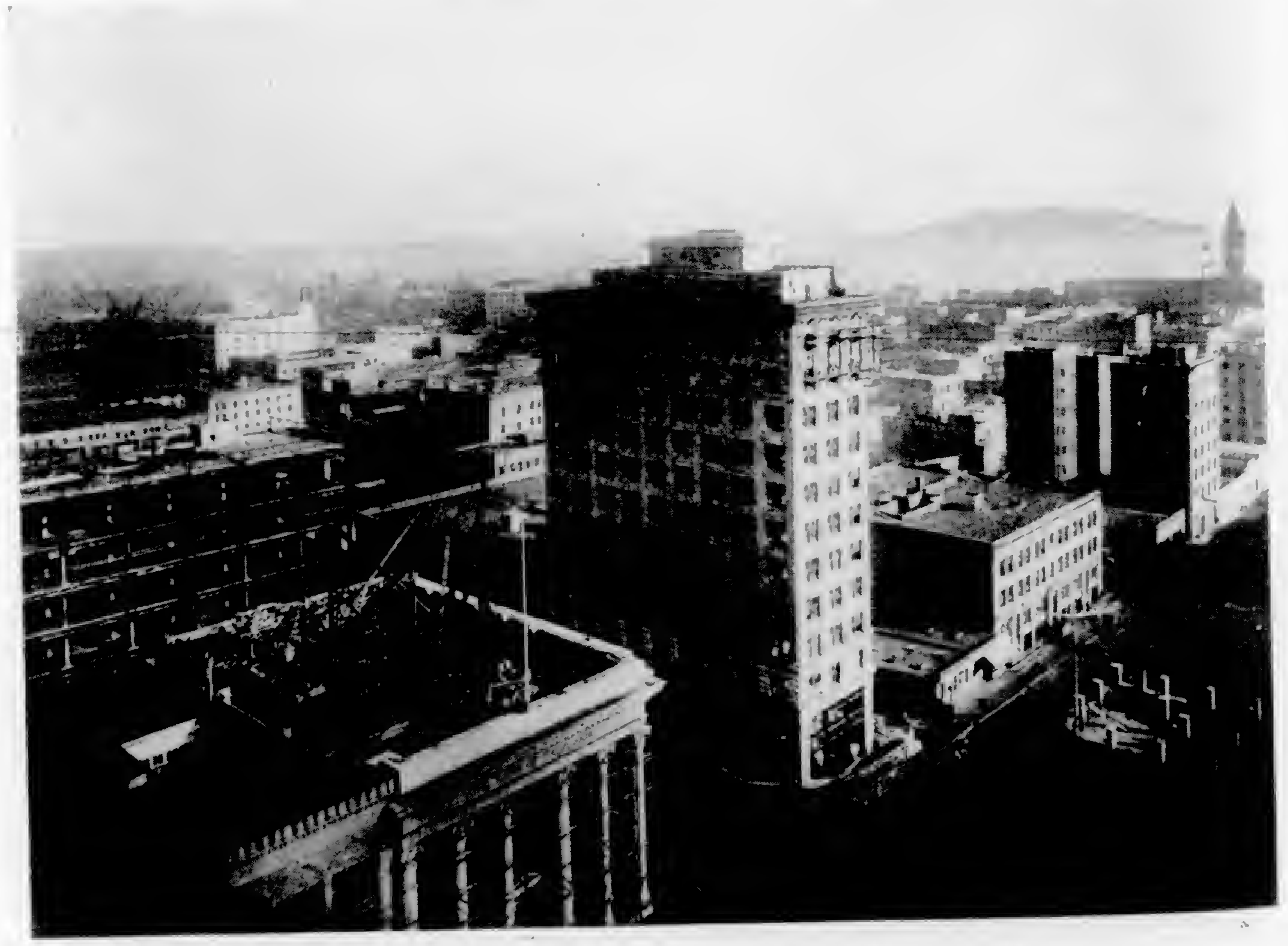
Some Recent Photographs Showing the Marvelous Building Activity in the Burned Section. The Pictures were taken from the Roof of the Merchants Exchange Building which Stands in the Centre of the Commercial and Financial District.



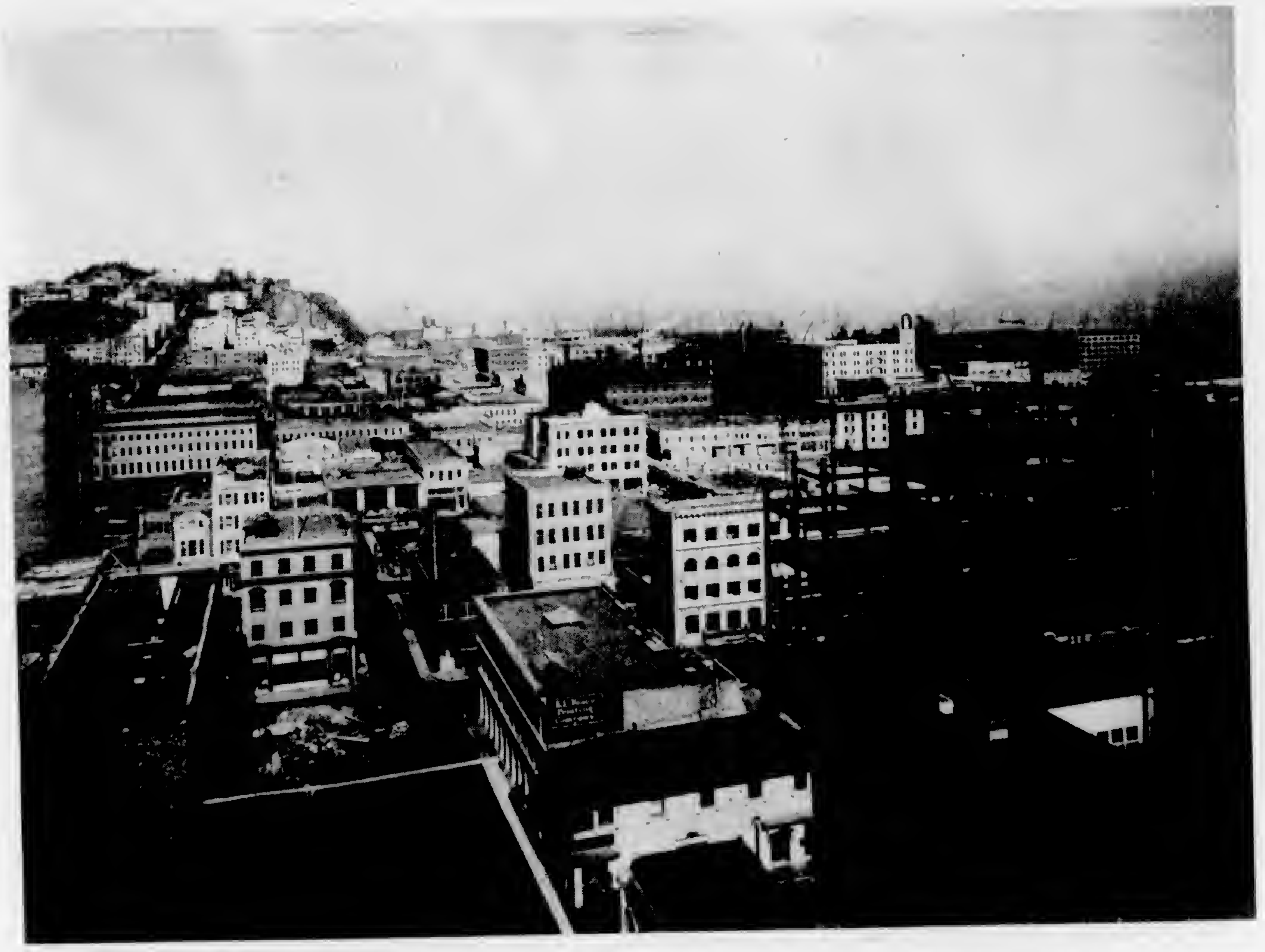
Merchants Exchange Building, San Francisco
D. H. Burnham & Co., Architects



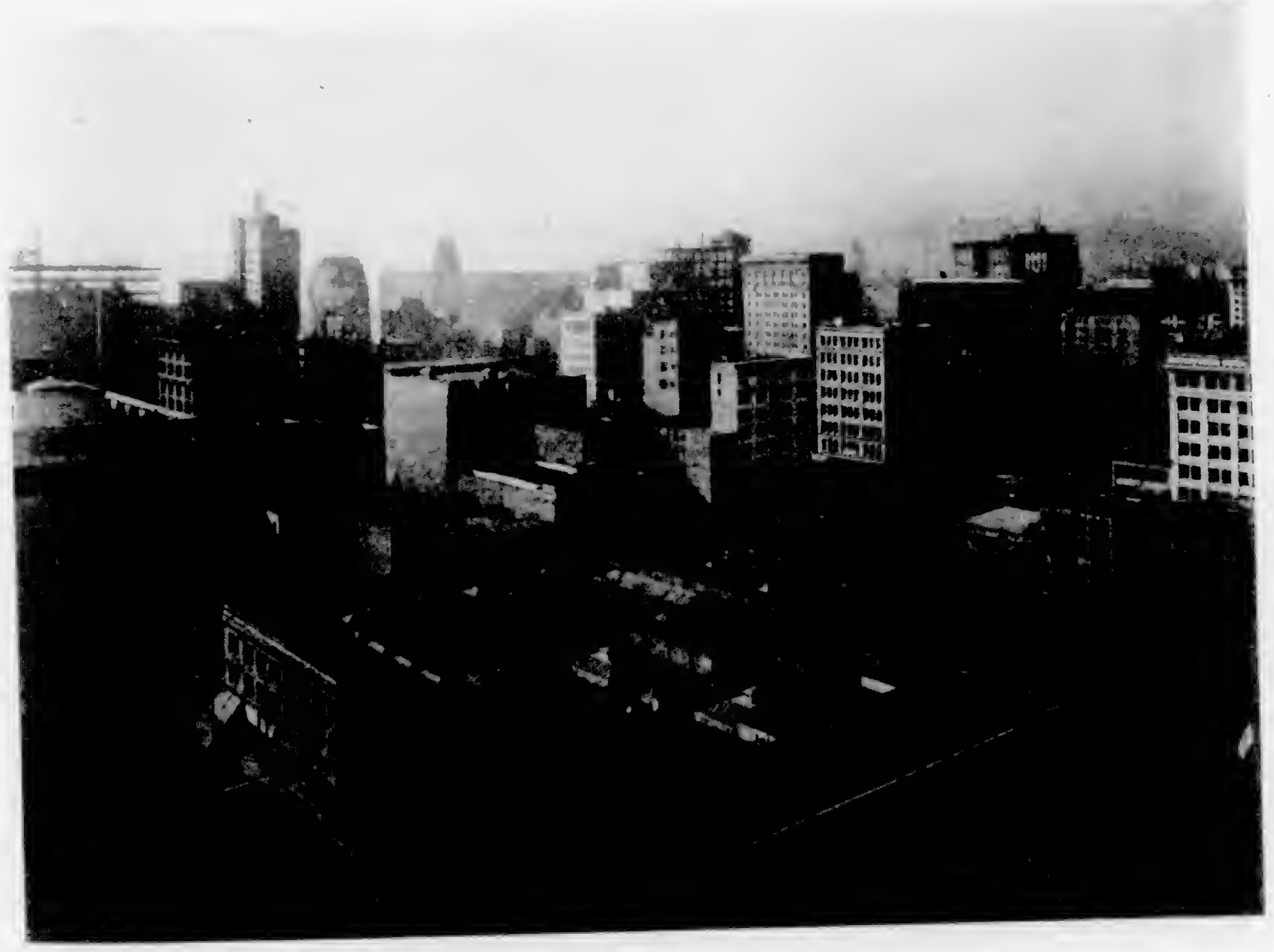
San Francisco Looking Northwest from the Merchants Exchange Building



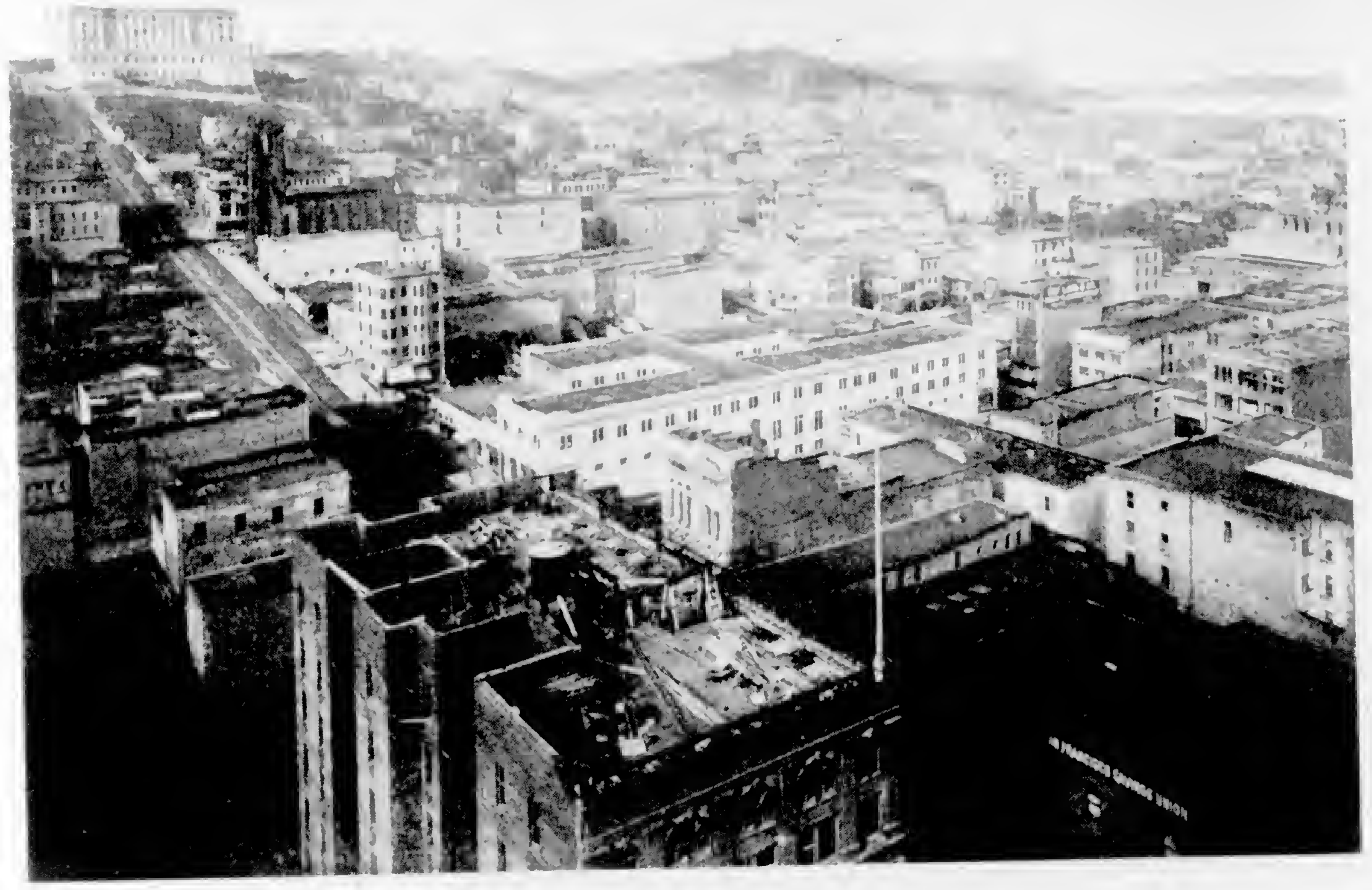
Looking Northeast from the Merchants Exchange Building



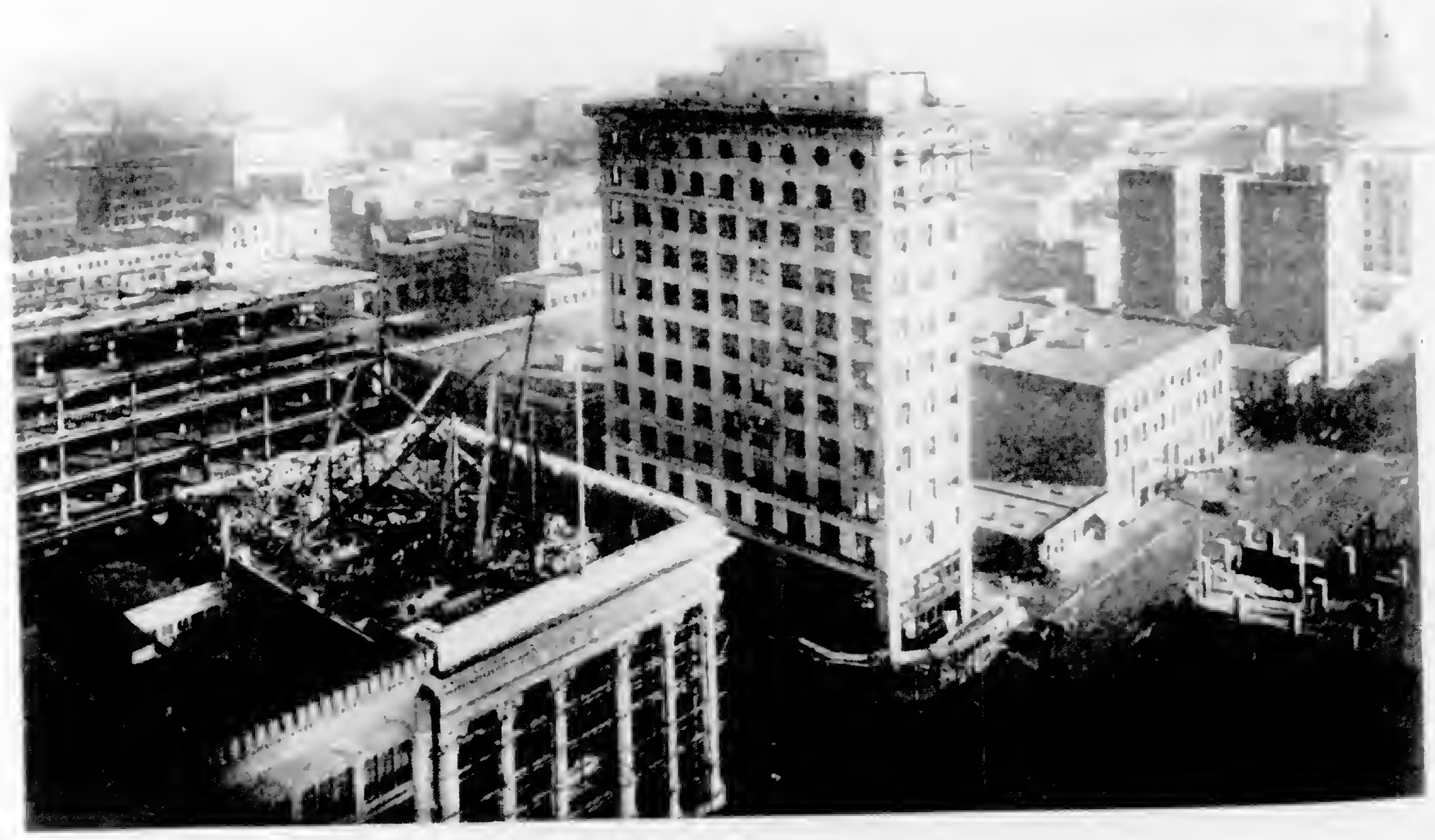
San Francisco Looking North from the Merchants Exchange Building



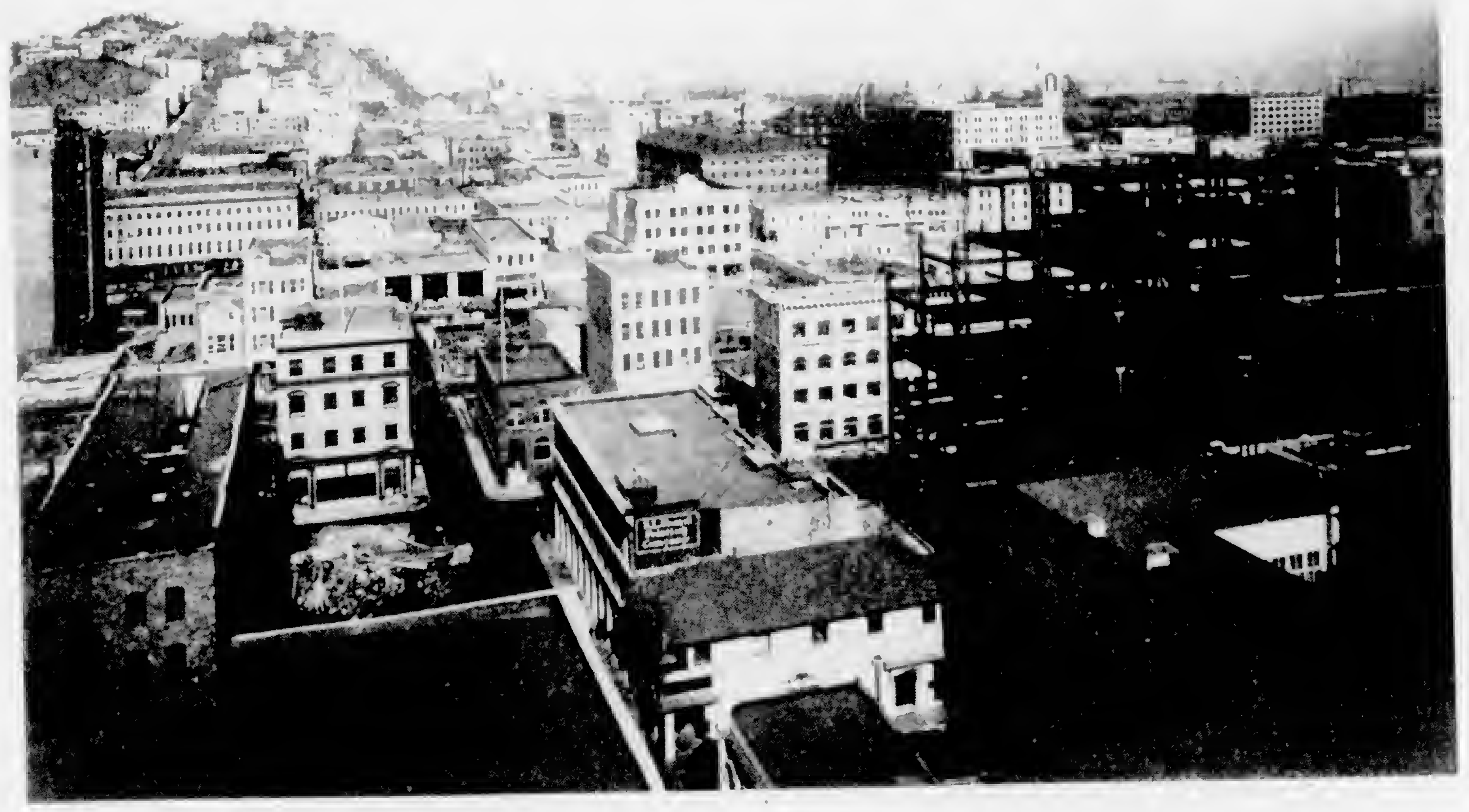
Looking Southwest from the Merchants Exchange Building



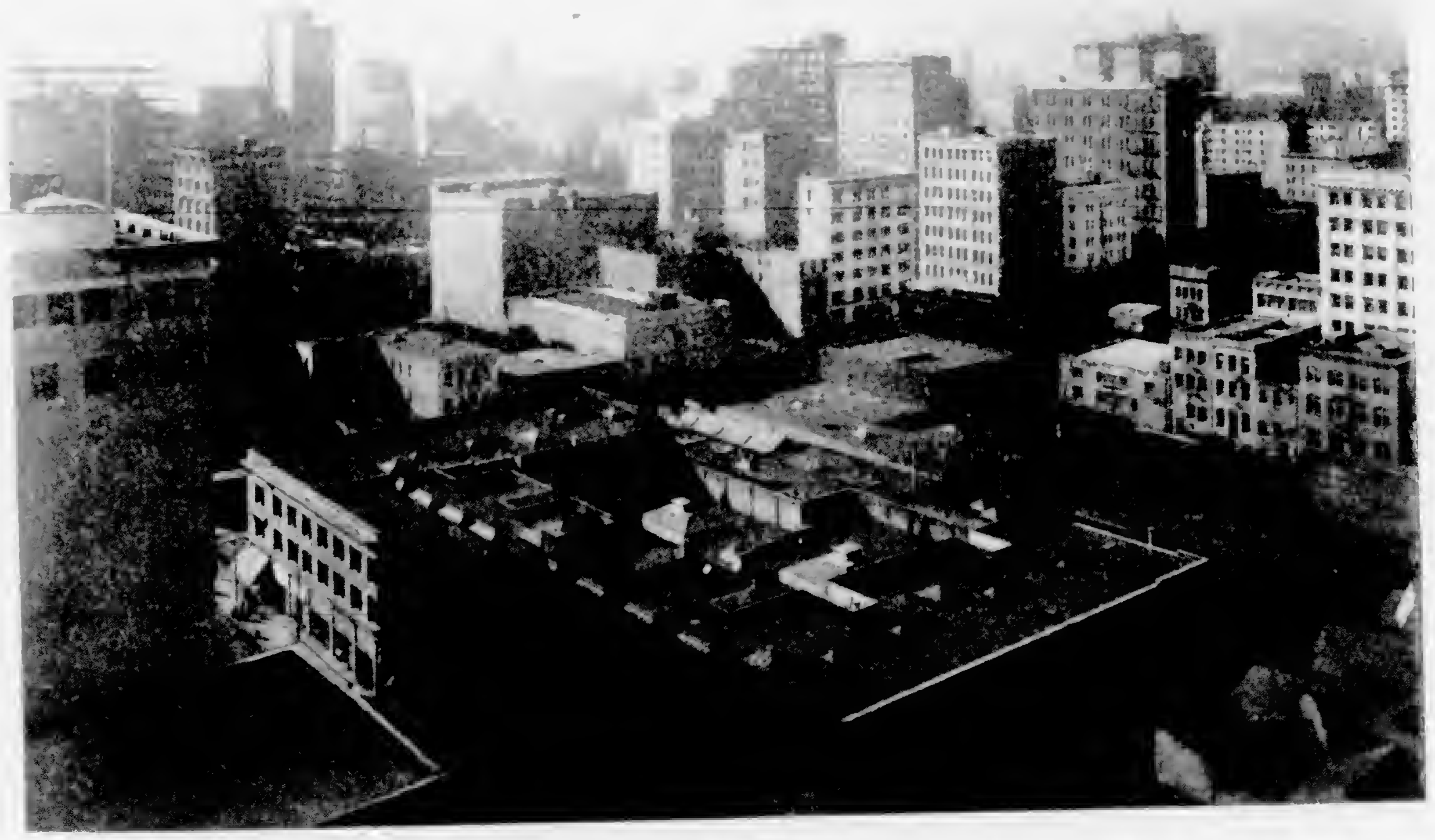
San Francisco Looking Northwest from the Merchants Exchange Building



Looking Northeast from the Merchants Exchange Building



San Francisco Looking North from the Merchants Exchange Building



Looking Southwest from the Merchants Exchange Building

A Plea for Fireproof Construction

CATASTROPHES, such as those at Collinwood, Ohio, and Boyertown, Pa., are possible in nearly every city and village in the United States, according to Richard L. Humphrey, engineer in charge of the structural materials laboratories of the government. He declares it is providential that more of these holocausts have not occurred. Mr. Humphrey, in his official capacity, in charge of the structural material investigations being conducted by the Technologic branch of the United States Geological Survey, has made a thorough study of fireproofing and is therefore well qualified to speak on this subject.

"The shocking catastrophe at Collinwood, Ohio, which sent a thrill of horror into every home in the country, did not result from exceptional conditions, but conditions that are to be found in thousands of instances throughout the United States. The same or even worse firetraps prevail in every village and town, and indeed in many of the large cities. Even where municipal laws are supposed to govern the erection of such structures, the conditions are often worse than in Collinwood. Such calamities as we have had the few months of this year do not come as a matter of surprise to anyone versed in the subject. The only surprise is that these catastrophes do not occur more frequently throughout this great country.

"The newspapers are now filled with statements made by school officials, calling attention to the necessity of fire drills—that these fire drills will prevent the loss of life from fire. Necessary and excellent as they are in their place, nothing could be more fallacious than such a general proposition. What is needed, as has been repeatedly pointed out, is the erection of structures which have the greatest resistance to fire. From what I can learn, the fire drill at Collinwood had started but the school building was such a flimsy tinder box that the fire traveled through the hallways and up the stairs faster than any possible fire drill. In such a building, and there are many of them, the fire will always win the race over the frantic children. Had the interior of the Collinwood school been reasonably fireproof, the loss of life would have been very much less and possibly no lives would have been lost.

"Laws should be enacted to prohibit the erection of anything except a structure of the highest fire-resisting type, especially when it is to be used as a school, hospital, theater, or other structure in which people assemble in large numbers, who in the event of a great fire, such as happened at Collinwood, would be to a certain extent helpless. In our hospitals and public schools, it would appear unwise to erect structures of more than two stories in height. In such buildings, in addition to wide stairways, I would have one or two chutes or tubes leading from the top story to the ground. These would prove not only much safer than fire-escapes, but also a much more rapid means of exit.

"The question of the height of buildings and the character of the interior structures is continually agitating public officials, but commercial interests seem to dominate, and buildings are erected that are known not to be the most safe for the purpose. This condition pertains as much to municipal structures as to any other class of buildings. It is a fact that the money available for schools, hospitals and other municipal structures is usually inadequate for the purpose, and the officials in charge in order to keep within the appropriation, are forced to erect cheap, flimsy buildings that are not fireproof.

"While the relative fire-resisting qualities of fireproof materials is not yet entirely established, it is a fact that these properties are sufficiently well known to permit the erection of reasonably fireproof structures. Yet in the face of all this, buildings are continually being erected with materials known not to possess an adequate resistance to fire and these buildings are a menace to the cities in which they are erected.

"The city of New York is full of firetraps, and it is a miracle that a great fire has not wiped out the greater part of the business district.

"The remedy for these conditions is not in elaborate systems for fighting fire, or any elaborate fire drills, which may or may not be effectively carried out, but in the enactment of strict municipal laws compelling the erection of structures entirely fireproofed with materials of the highest quality, and especially in the prevention of the erection of flimsy structures, where women and children gather in large numbers, as for example, schools, theaters, hospitals and similar buildings. Unless such action is taken, greater calamities than those at Collinwood and Boyertown, attended by even greater loss of life will undoubtedly occur.

"The continual increase in the height of buildings, for office or mercantile purposes, as for example in the city of New York, gives rise to many problems. One of the most important is the question of handling through the streets the immense population crowded in a very small district. As this congestion increases through the erection of these buildings, it will be necessary in the near future to double-deck the streets in order to accommodate this immense population and also to multiply the present transportation facilities. It is apparent, therefore, that a great calamity in the shape of a fire such as visited Baltimore and San Francisco, must necessarily be the means of destroying the lives of many people who would be unable to get away in safety with the facilities now existing.

"Buildings should not be erected so high as to prevent the fire department from fighting a blaze in the upper parts of such structures, unless these buildings are supplied with fire-fighting apparatus of their own, capable of taking care of any fire beyond the reach of the firemen. At present the average fire department is helpless or seriously handicapped in successfully coping with the fire in a building over 150 feet high. This means that the firemen can take care of the first fifteen stories of a skyscraper. Beyond that, the tall buildings will have to look out for their own safety against fire.

"It is a matter of record borne out by insurance statistics, that this country spends enormous sums of money in providing equipment for fighting fires, while foreign countries spend their money in building structures which offer the greatest resistance to fire. The per capita loss in this country yearly exceeds $5 against an annual loss in 21 of the principal cities of Europe of 35 cents per capita. Estimating the population of the country at 80,000,000, the loss from fires here is $240,000,000. If we had the same conditions that prevail in European cities, our loss would be but $26,400,000 a year.

"Statements have appeared in the daily papers throughout the country that the school building at Collinwood and the Parker building in New York were examples of reinforced concrete construction, and these fires proved the worthlessness of this class of construction. Neither building contained any reinforced concrete. Concrete has been demonstrated to be one of the very best materials for fireproofing purposes, and its increased use will add materially to the public safety."

Wall Paper Not Unsanitary

PERHAPS there are people who believe the stories they read in the magazine section of the Sunday papers. If so, an article recently published in the New York American that attacks wall paper as poisonous and unsanitary may possibly do harm, although the lies have been nailed so often that it would seem as if every man, woman and child in the United States must be familiar with the facts, which are succinctly stated in the following letter written to the New York American by George H. Keim, treasurer of the Gledhill Wall Paper Co.:

"Dear Sirs:—Our attention has been called to a publication in your issue of Sunday, March 8th, entitled 'Why Wall Paper Is Often Poisonous.'

"As the statements embodied in the publication are not founded on facts, we respectfully request that you publish this letter or some similar article which may briefly show that wall papers are not detrimental to health.

"The article in question states that workers in wall paper factories die from consumption caused by the inhalation of poisonous dust.

"A visit to a wall paper factory will show that the employes are a robust set of men. We have manufactured wall papers for many years, and the rate of mortality of our employees is not above the normal.

"There is no arsenic or other poisonous substance used in the manufacture of wall papers. All colors are guaranteed to be free from arsenic. A chemical analysis of wall papers will fail to find any ingredients which are dangerous to good health.

"Your article also states that a law exists in Massachusetts requiring the word poisonous to be printed on each yard of wall paper. There is no law in Massachusetts or any other state to that effect.

"All wall papers are printed on clean paper. As a matter of fact the paper is the same as the news paper on which your journal is printed. The paste used is generally fresh flour paste, which is absolutely harmless.

"We shall be pleased to have a representative of your publication visit our factory, as we can readily convince him that no deleterious chemicals are used in the manufacture of wall papers."

* * *

The Origin of "He's A Brick"

CALLING a man a "brick" as an expression of admiration, or of the superior qualities of manhood, is a bit of classic slang that originated way back somewhere before the days of Christ. Writers differ somewhat as to the exact origin and manner of first using the term. One authority has said that Plutarch, in his life of Agesilaus, the King of Sparta, gives this origin of the quaint and familiar expression. "On a certain occasion, an ambassador from Epirus, on a diplomatic mission, was shown by the king over his capital. The ambassador knew that though only nominally King of Sparta, he was ruler of Greece, and he looked to see massive walls rearing aloft their embattled towers for the defense of the chief towns, but he found nothing of the kind. He marveled much at this, and spoke of it to the king. 'Sire,' he said, 'I have visited most of thy principal towns, and find no walls reared for defense. Why is this?' 'Indeed, Sir Ambassador,' replied Agesilaus, 'thou canst not have looked carefully. Come with me tomorrow morning, and I will show you the walls of Sparta.' On the following morning the king led his guest out upon the open plains, where his army was drawn up in full battle array, and pointing proudly to his serried host, he said, 'There, sir, thou beholdest the walls of Sparta—ten thousand men, and every man a brick.'"—The Clay-Worker.

Some Answers to Queries

To Prevent Echoing in An Auditorium

To the Architect and Engineer of California: There is a building in Monroe, Sevier county, that was erected for dancing, and also for small home theatricals. I am told that the owners are troubled by echoing in the auditorium while holding such theatricals. The size of the building is 58 feet by 120 feet, with stage 25 feet by 58 feet, at one end. The ceiling is semi-circular, 30 feet high in the center. The proscenium is 22 feet high by 22 feet wide. Will you please be kind enough to tell me the cause of this echoing and give the remedy if there is one? Yours very truly,

T. T. DAVIES, Architect, Provo, Utah.

Referring to the above communication, I will say, that the reason for the trouble mentioned is very simple, but the remedy is not as easy to find.

Ever since the story books told us of the celebrated "Ear of Dionysius," in which we were informed that it was possible for him to sit at one point and hear the whispers of his victims, and added to that, the tales told of the Mormon Temple at Salt Lake, the unthinking architect has tried to copy those illustrious models.

It was probably a far cry from this idea, that caused the builder of the hall referred to, to make a half circle arched ceiling, in fact a barrel vault, which could not have been better planned if he had wished to create an echo house for some "Midway."

While the science of acoustics is very much in theory, yet some facts are well established, and one is, that circular ceiling is nearly always defective, as it converges the sound waves toward a common center in such a manner as to give confused and imperfect effects. Perhaps at some points there may be, in imitation of the great examples mentioned above, a surprising concentration of waves, and slight sounds be greatly magnified, but outside of this, the result will be generally unpleasant. Imagine, if you have not experienced it, a railroad tunnel, and what effect it would have to sing or recite in it, and you will get some slight idea of the case in point.

An eliptical surface does not seem to be as objectionable, probably from the same reasons, that the sound waves are not concentrated in one center. Of course if the elipse were perfect, there would be two foci, where the sounds would collect, but it would be almost a practical impossibility to construct a perfect elipse, and a variation from these lines might have the tendency to give a favorable direction to the sound waves.

There must be something to break the waves in order to produce the best results, and polygonal sided ceilings have been generally satisfactory, and it is probable that if the ceiling above referred to, were to be changed to a twelve or even nine sided polygon, it would be cured, especially if it were panelled off with good sized beams; I am acquainted with several such rooms which are very successful. Very truly yours,

HENRY F. STARBUCK, Architect,
Macdonough Building, Oakland.

* * *

Keene's Cement

To the Architect and Engineer of California: Will you kindly tell me how Keene's cement works with ordinary Portland cement, as an outside finish for walls, and especially for moldings and heavy projections? In what proportions should they be used, and will it stand weather as good as ordinary cement work? I have used Keene's cement for various purposes (but never for outside work), and believe some of it was nothing but ordinary plaster of paris. Will you please tell me of some reliable brand of Keene's, and who handles it in San Francisco?

Yours very truly,
J. D. SULLIVAN,
1232 College Ave., Santa Rosa, Cal.

In ordinary building parlance, the term "cement" is confined to the hydraulic cements, Portland cement, natural rock cement, slag cement, etc. It is true that common quick lime, and calcined gypsum like plaster of paris, wall plaster, etc., are in use because of their cementive character, and yet it is because of custom referred to, that the application of the term "cement" to calcined gypsum, as in the case of what is known as Keene's cement, has so frequently been misleading.

But as your experience with it has lead you to believe, Keene's cement belongs to the family of "plaster of paris." It is a calcined lime sulphate, treated with alum. For outside finish it is neither advisable nor necessary to use it alone or in combination with Portland. For gypsum products will withstand neither conflagration conditions nor the effects of weather sufficiently well to render their use advisable for such purposes as you suggest. They will be an element of weakness in any mixture made with Portland except in very small proportions such as are used for regulating the "set" of all Portland cements. If it is necessary to have a pure white cement for your purpose, you might use Lafarge cement which is a natural lime rock product manufactured in France, and as sold here is a natural hydraulic cement with a greater or less component part of hydraulic lime.

Or put yourself in communication with the agents of the Sandusky Portland Cement Company. The Sandusky Portland Cement Company is represented in California by the Building Material Company, Monadnock building, San Francisco, and by F. T. Crowe & Company, Seattle, Tacoma and Spokane, Washington, and Portland, Oregon. Try their new product, the Medusa White Portland cement. This is a true Portland, and should serve every purpose. It is beautifully white, develops all the strength that belongs to a Portland, and as for weathering, will become harder and harder as the years pass.

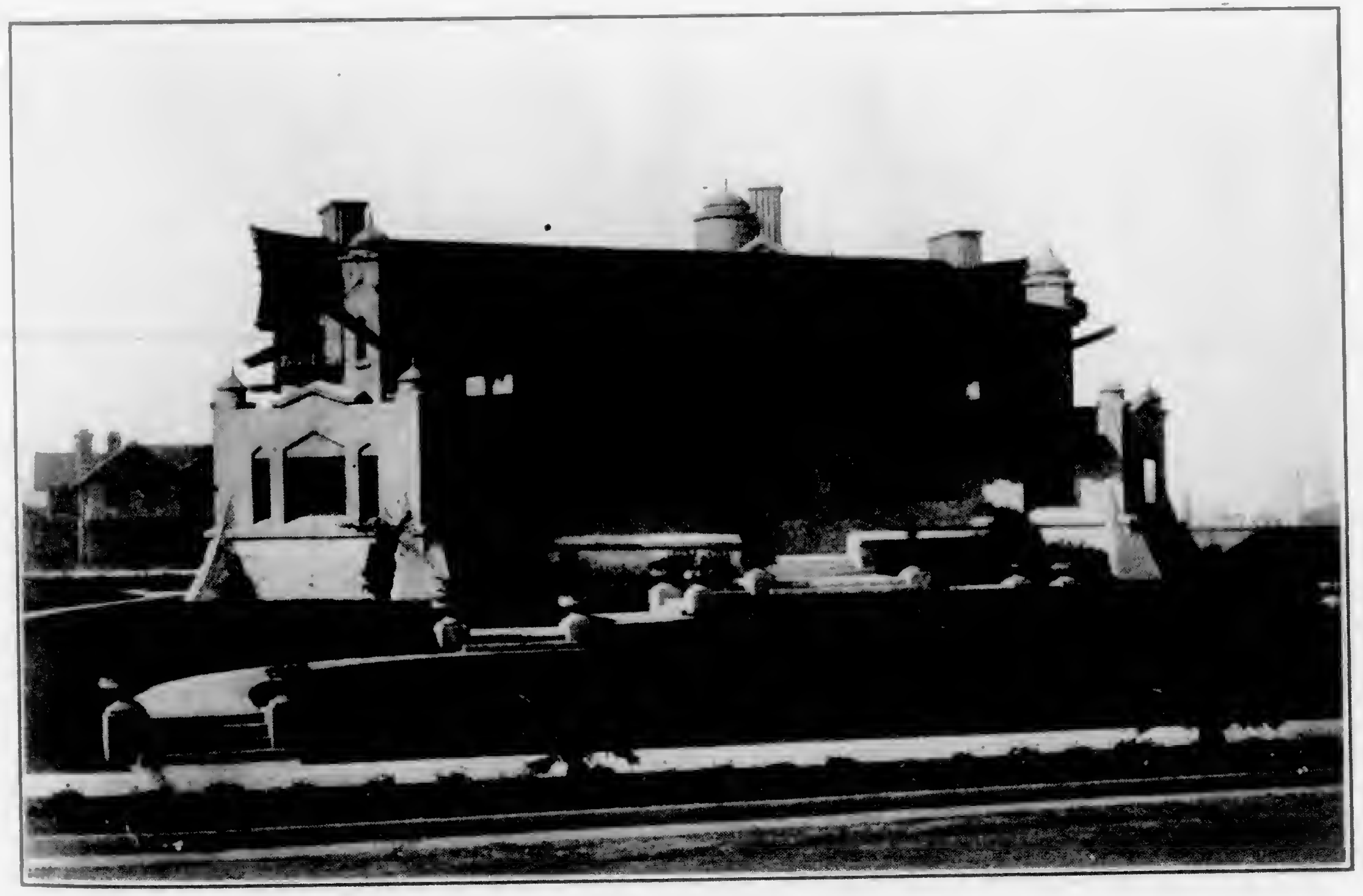
WM. B. GESTER, C. E.

* * *

Cement in Bags Transformed into a Wall

There is a wall of cement in Los Angeles which shores up one side of a building that has an artistic value never intended by the builder, says a local newspaper. He had moved his bags of cement on to the ground to be ready for work and was then called away on some other job for a day or two. In the meantime one of the very infrequent rains came and each sack turned into stone under the action of the water and the fabric of the sacks themselves were absorbed into the cement so that it was impossible to remove it. Consequently each sack was brought into the wall as if it had been a boulder on the line of an old stone wall. They were then chinked and bound together with worked cement, and after a time the weather disposed of the gunny sacking, but left the blocks marked with the impress of the weave. The result is a highly ornamental cement wall, resembling at a little distance a wall of some woven material.

Interior Monterey County Bank, Salinas, Cal. W. H. Weeks, Architect
Art Marble Work by Pacific Coast Art Marble Company



Residence of Mr. E. P. Bryan, Los Angeles (Front)
Chas. F. Whittlesey, Architect Yard & Hichborn, Contractors

good as ordinary cement work? I have used Keene's cement for various purposes (but never for outside work), and believe some of it was nothing but ordinary plaster of paris. Will you please tell me of some reliable brand of Keene's, and who handles it in San Francisco?

Yours very truly,
J. D. SULLIVAN,
1232 College Ave., Santa Rosa, Cal.

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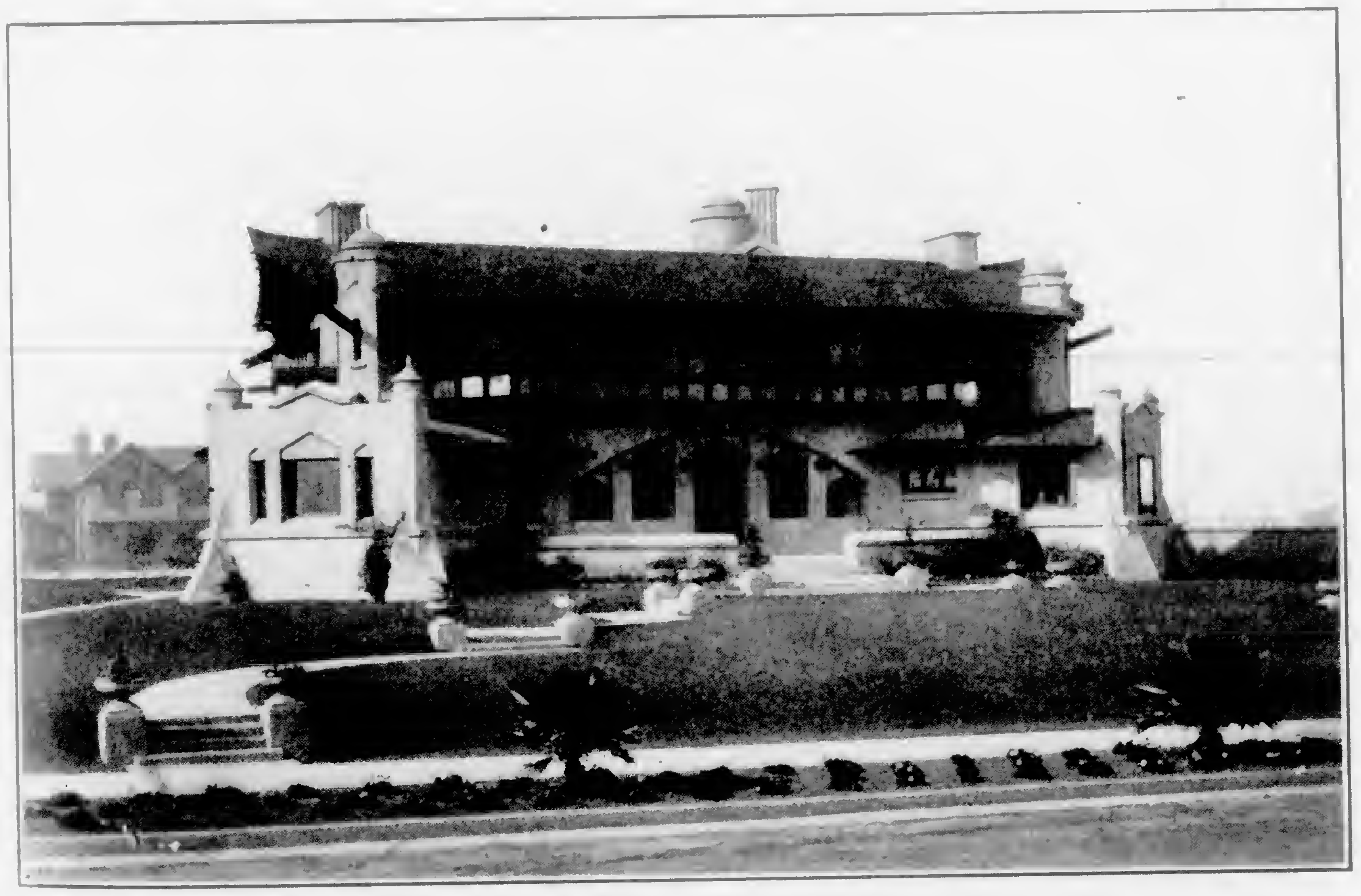
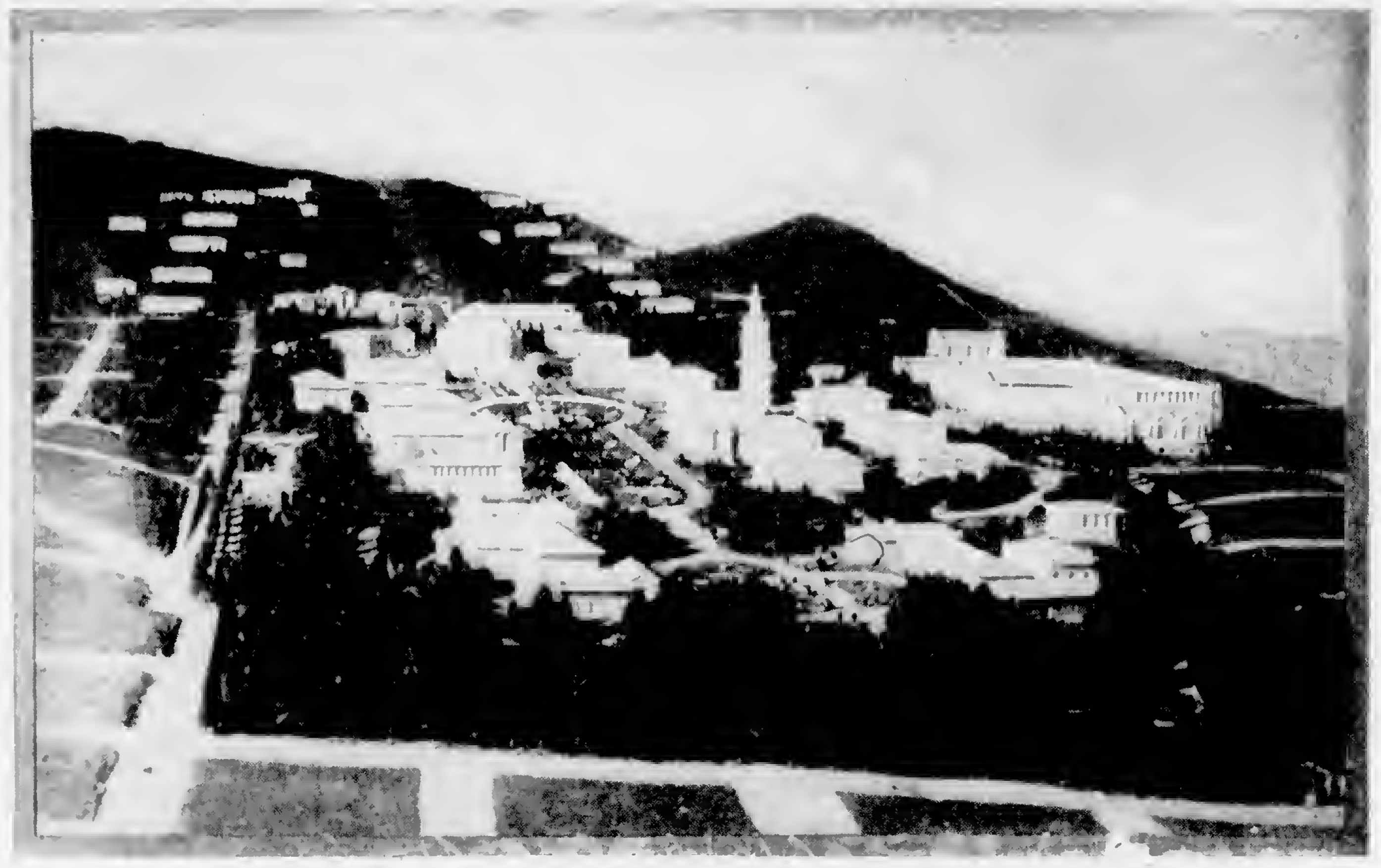


Residence of Mr. E. P. Bryan, Los Angeles (Front)
Chas. F. Whittlesey, Architect Yard & Hichborn, Contractors

Looking Down Sansome Street, San Francisco May 1, 1908
The Highest Building on Each Side of the Street is Equipped with Hausmann Sash Carriers

Portland Cement

It may not be generally known that "Portland" cement takes its name from the Isle of Portland, in southern England. Here are located ancient quarries, which at one time produced a superior quality of building stone. An Englishman named Joseph Aspdin of Leeds, the father of the modern cement industry, in 1824 patented a process for mixing and burning certain proportions of lime and clay. When the resulting material was moistened and allowed to harden, it so closely resembled the stone of Portland that he called it "Portland cement," and the name has persisted for nearly 100 years.



General View of Plan for the Greater University, Looking East
Monsieur E. Bernard, Paris, Architect

Plans for a Greater California University

THE Board of State University Regents has received the perfected plans for the greater University at Berkeley. The University of California is the only university in the United States, except Stanford and the university at Washington, D. C., that is proceeding with its physical development on definite architectural lines.

In 1896 Mrs. Phebe Hearst called for competitive plans for this University. The competition was international. The prize for the best plans submitted in this contest was awarded to H. J. M. E. Bernard, a Frenchman.

These plans were turned over to John Galen Howard to be perfected. Professor Howard has lived on the college grounds for the past eight years, and it is said that he is acquainted with every tree and shrub, and the plans submitted by him have been prepared with a view to having them absolutely adapted to the campus. Every building and each tree has been arranged with the idea of artistic effect. Mrs. Hearst, who has given special attention to these plans for the greater University, has expended approximately $200,000 on their preparation from their inception in the international competition to the present time.

Although they have not been finally accepted, the proposed work is progressing and $600,000 will be expended on the new library building next year.

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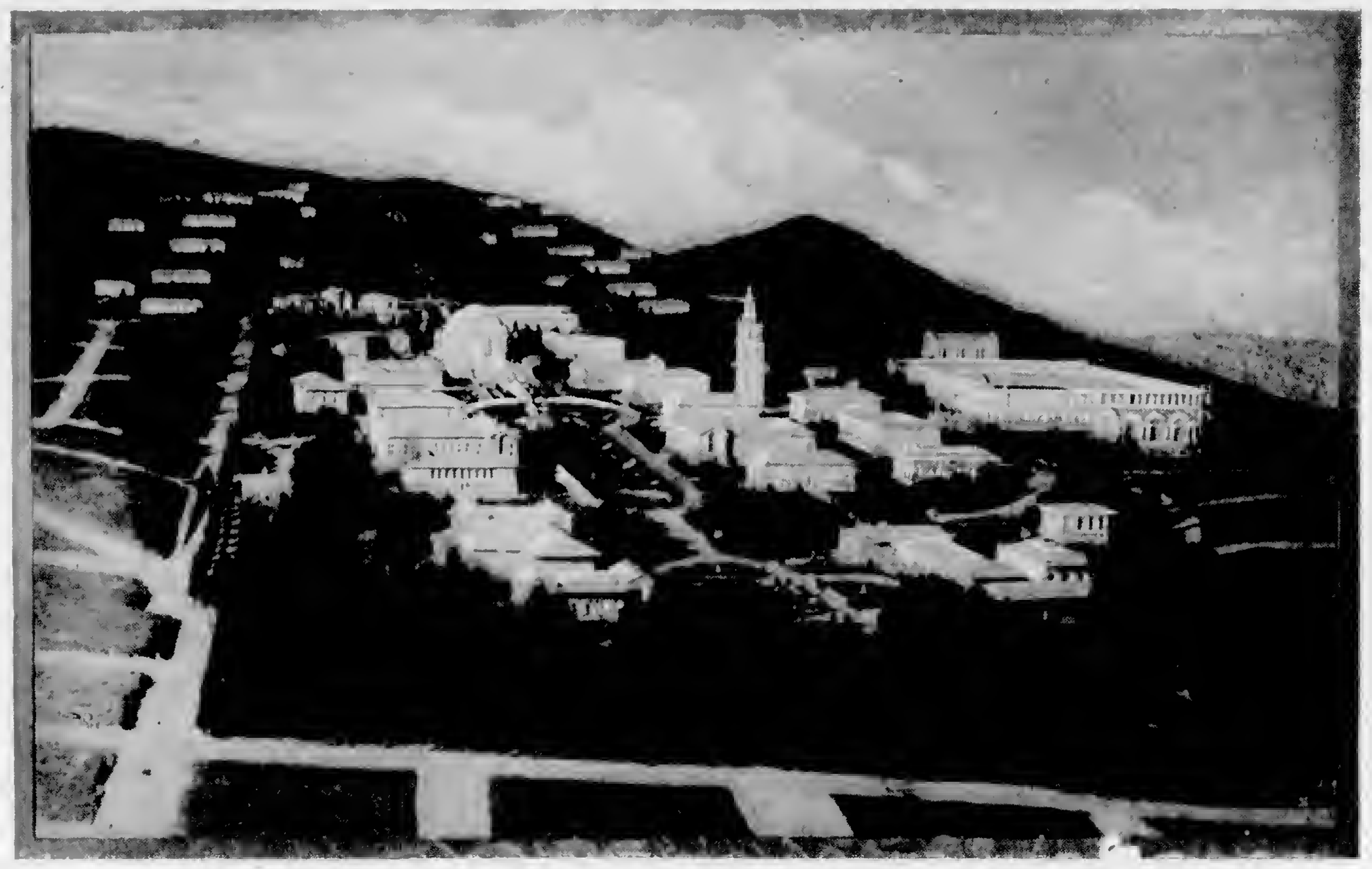

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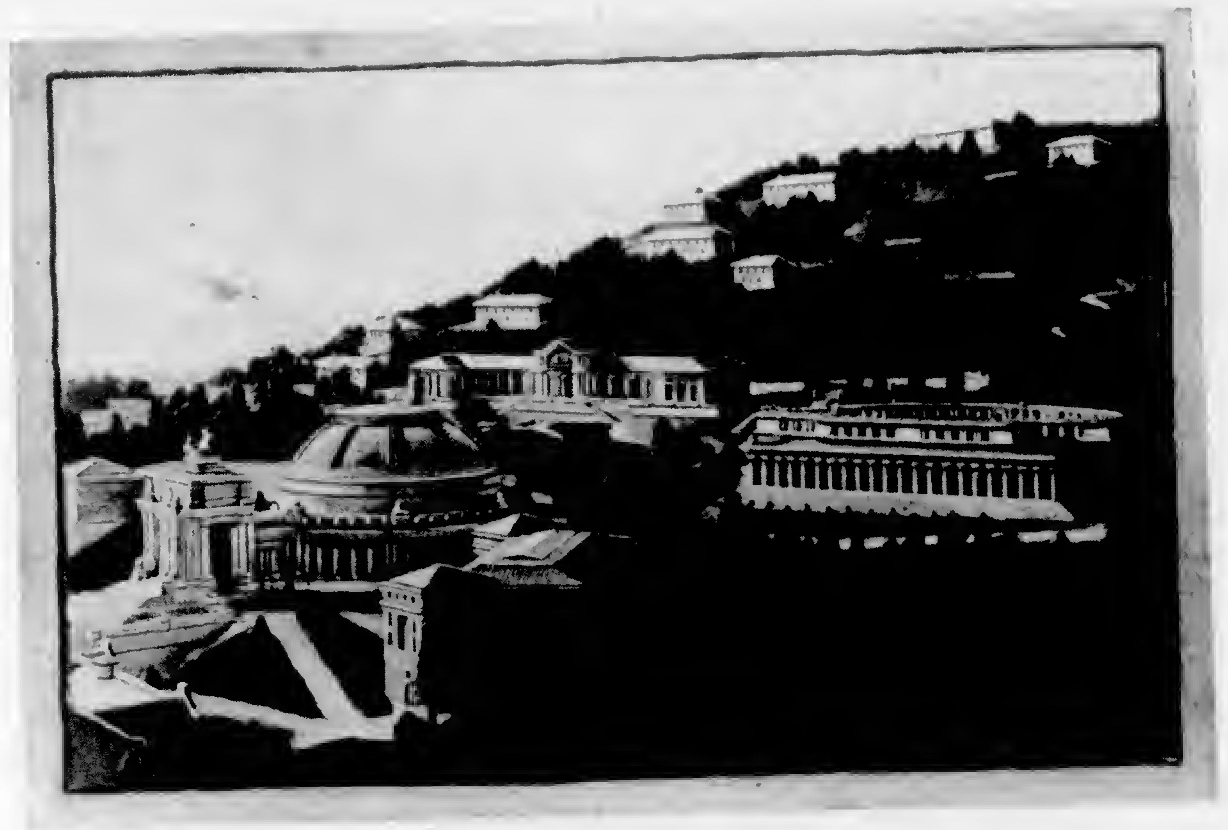
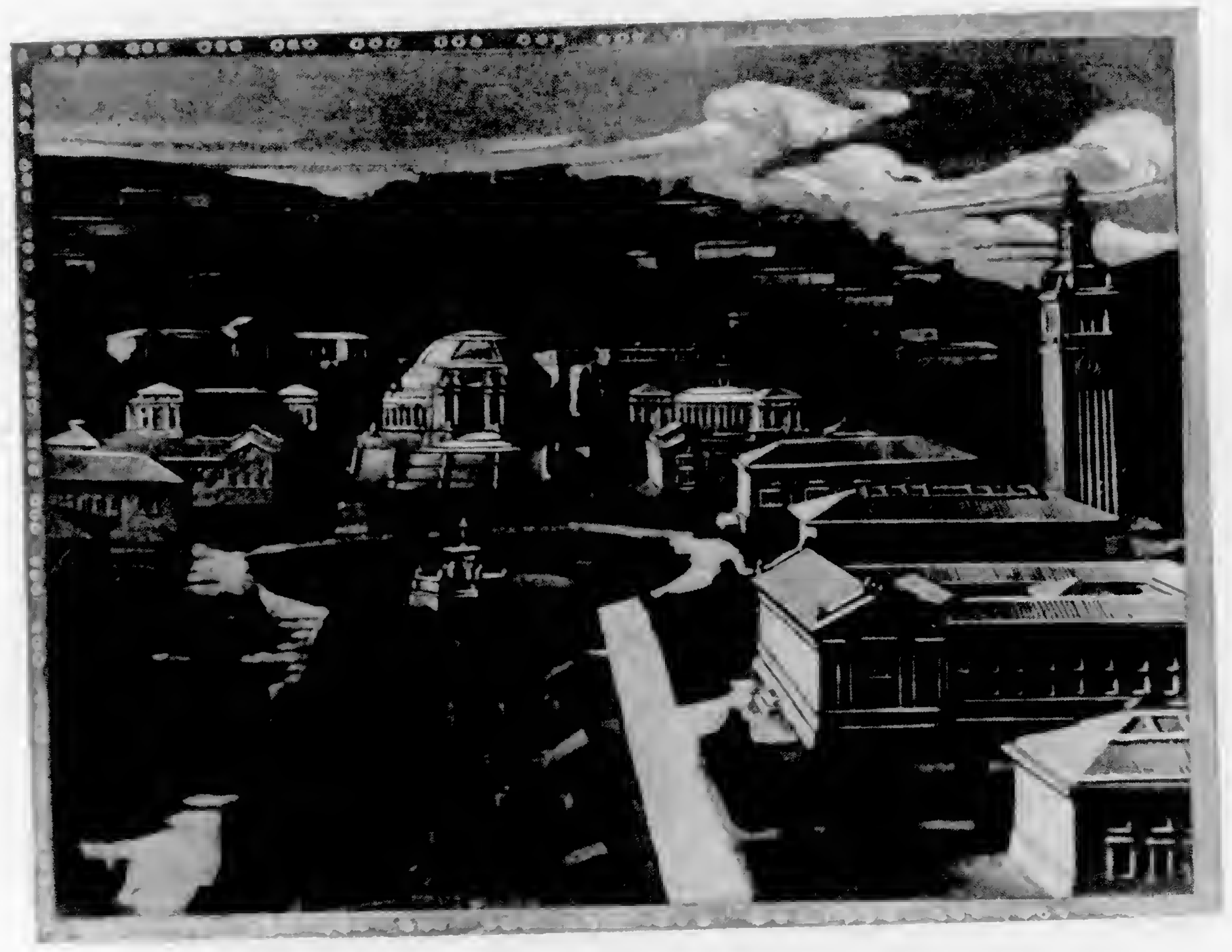
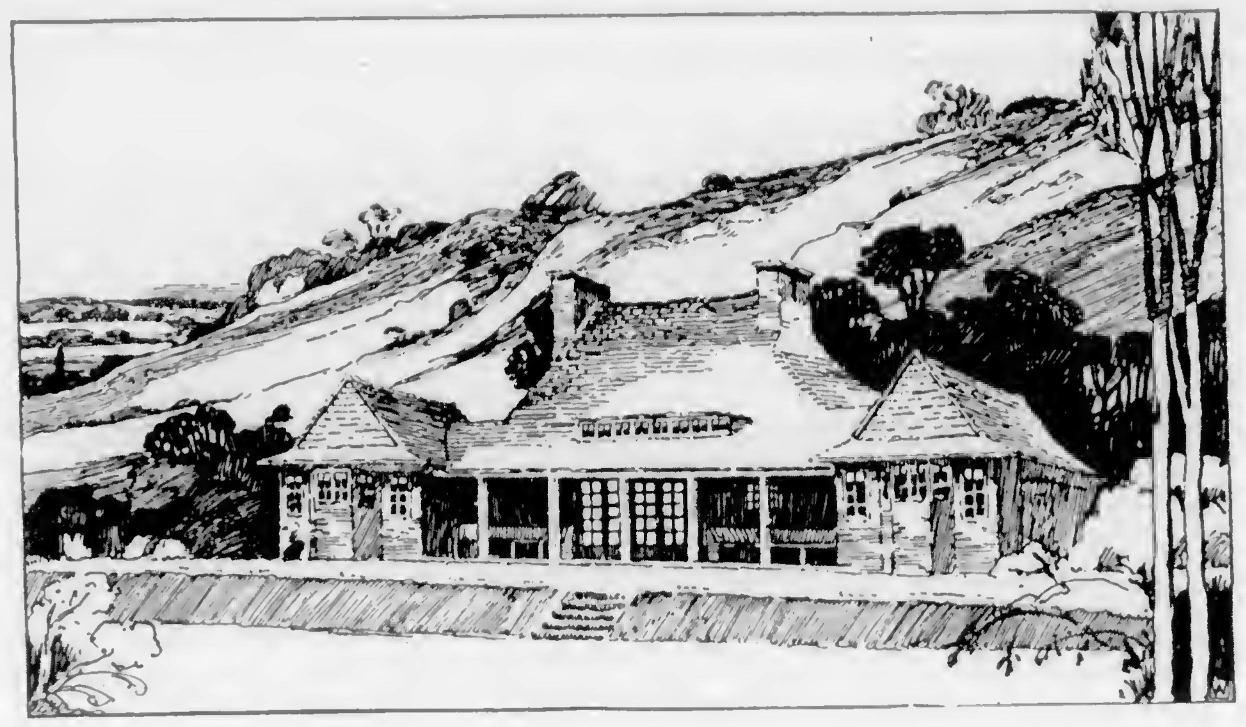


Detail of Plan for the Greater University, Showing Greek Theater and Proposed Auditorium
Monsieur E. Bernard, Paris, Architect



Detail of Plan for the Greater University, Looking East Along Main Axis to the Auditorium, Showing the Campanile
Monsieur E. Bernard, Paris, Architect



An Interesting Bungalow

By W. H. ANSELL

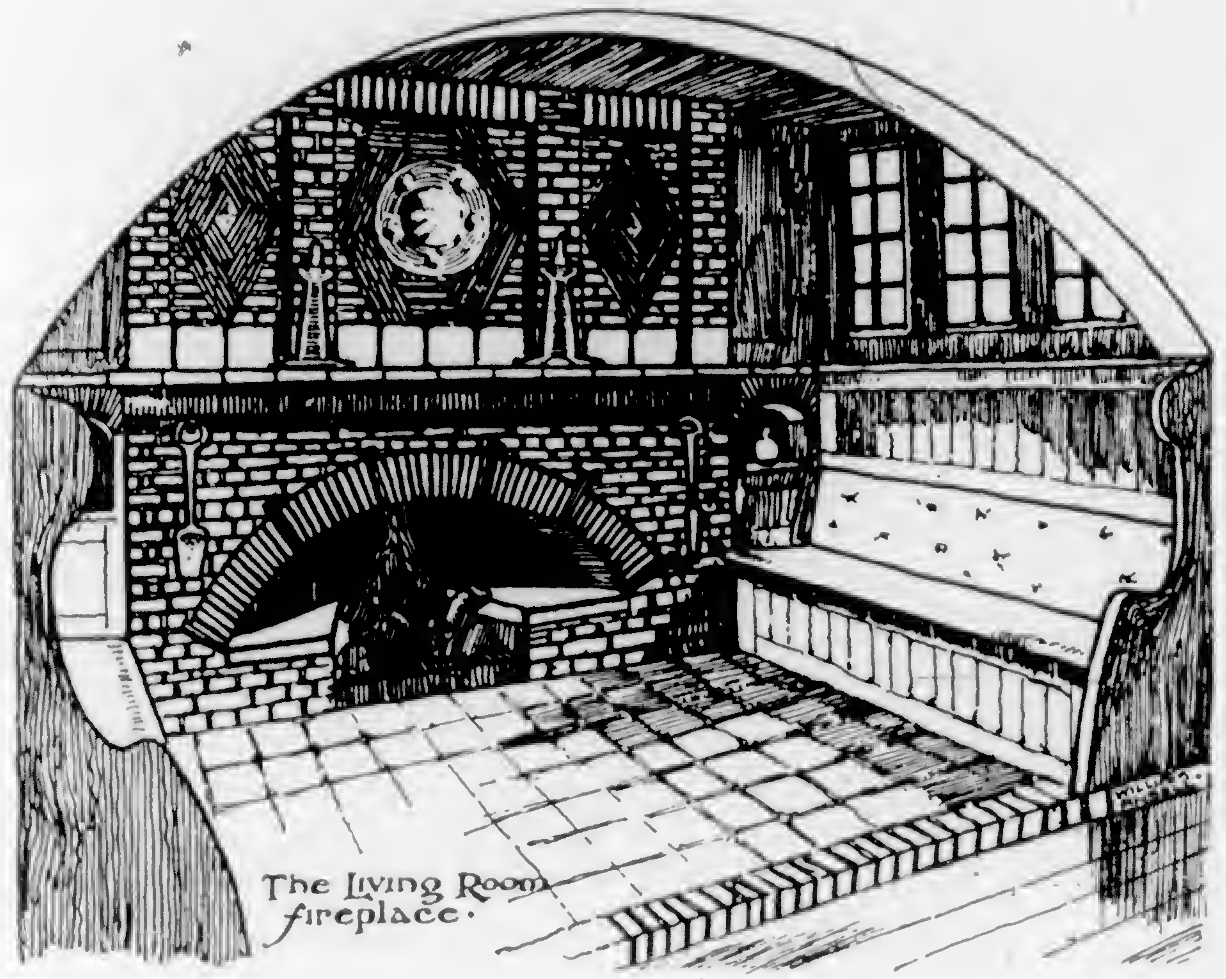
UNDOUBTEDLY the most successful bungalow is one that has been designed with a governing idea, a root motive, so that the purpose of the building is obviously expressed in its planning. The illustrations show such an one. It was planned for a man of moderate wealth, who, whilst wishing to get away from the conventionalities and restrictions of city life, had the intention of "roughing it" in comparative comfort, and of keeping his bungalow well filled for a great part of the year with young and lively company.

The whole of one end of the central part opens to the veranda, which has, on either side, deep, shady lounge bays. Meals will be often served in these bays, and to facilitate this a door communicates from the kitchen to the veranda.

The other end of the living-room has a small stairway leading to a minstrel's gallery, where the fiddlers play when the hall is cleared for the dance or the winter party. The sleeping arrangements are a feature of the planning. From the entrance hall two bedrooms are entered, in which the married visitors are usually accommodated, and at either end of the veranda is a sleeping apartment, men's side and girls' side.

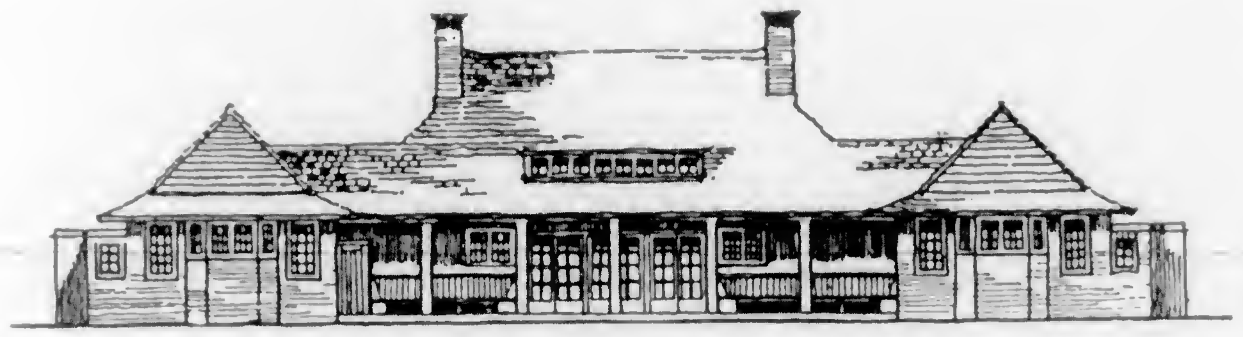
Each of these apartments is divided into three cabins by thin concrete partitions. One side of the cabins is fitted with two hanging bunks which can be unhooked and taken down. At the end of the bunks is a roomy wardrobe or cupboard fitted with shelves above and hanging space below. Opposite the bunks are hinged seats which fold flat against the wall when not in use. Outside the wardrobe are strong shelves where trunks and bags may be stored. The fitting of mirrors with convenient shelves for brushes completes the furnishing of men's side and girls' side which thus require no movable furniture whatever, but are ready at any time for guests. As each cabin is six feet wide and has its own door and window it can be made into a private room. To minimize the amount of service required, wash basins are fitted in a bay with high windows, and at the end of the compartment, approached through a cut-off lobby, is the sanitary adjunct which contains a shower bath.

The outside walls are brick whitewashed, and as even so simple an operation as whitewashing is not always done in the best manner, save, perhaps, when the genius of a Tom Sawyer directs the proceedings, it may

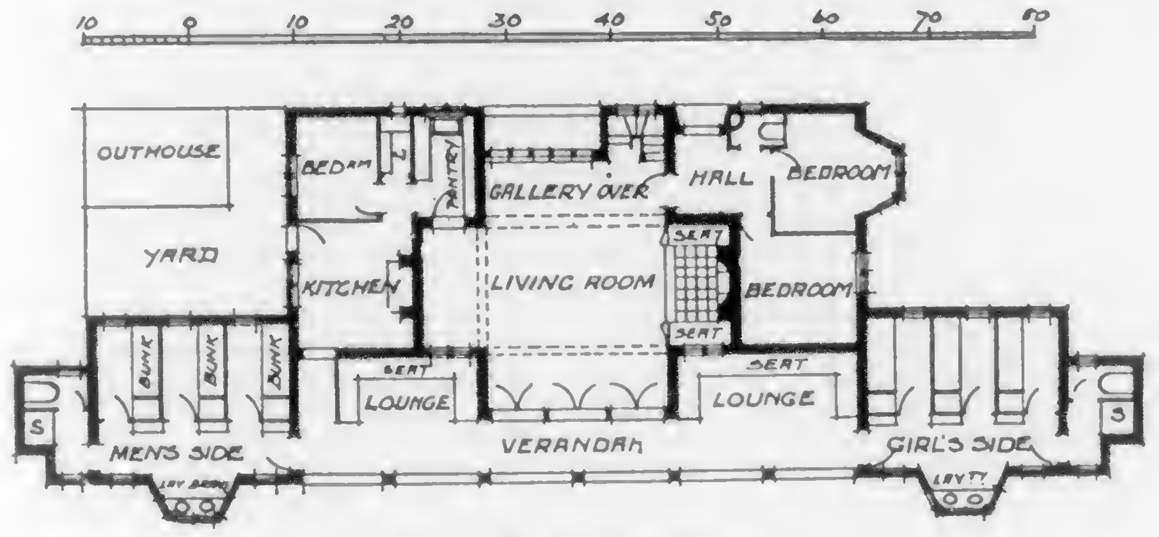

The Living Room fireplace.

be as well to specify how this was done. Unslaked lime was used, mixed in small quantities, and while the ebullition was going on a generous allowance of Russian tallow was stirred in, and the hot preparation applied immediately to the walls. Two coats of this made the exterior like a duck's back, so far as throwing off the water was concerned.

The walls inside were plastered. The living-room depends for its effect on its shape, a Greek cross, its simple, big-arched recesses over table and



ELEVATION



PLAN OF BUNGALOW

fireplace, and the air of mystery attendant on the minstrel's gallery overhead. The fire is open, with small brick hobs on which the log ends rest. The mantelpiece is formed with thin red bricks wide-jointed, and a shelf of the same thick red tiles with which the whole recess is paved. The wall above is divided into panels, which have tiles set edgewise in diamond and hexagonal shapes. On the center panel is hung a dull gleaming copper targe, in which the flickering candles are reflected.

The side seats of oak, left clean from the tool with ends shaped like old settees, have boxes under, in which many things are stored, from golf clubs to Wagnerian opera.

The furniture of the living-room almost demands a special article to itself. With the exception of the grand piano it was made to the architect's designs by the village wheelwright, and some of the fine craftsmanship that one finds in the old farm wagons is also found here. In short, simplicity, but not dullness or monotony, has been the root motive, the governing idea of the whole.—The Brick Builder.

* * *

The Present Cost of Building

THE question of the cost of building is of supreme importance just now, but there is a wide difference between what prospective builders would like to have it and what architects and contractors are able to do, and no one regrets this more than the architects, as it would mean a great deal more work, says a recent issue of The Economist. Some of the leading men in the business, however, according to the following views, seem to agree that this is a good time to build.

Edwin A. Renwick of Holabird & Roche, has recently made extensive investigations as to the cost of construction. He has interviewed over 100 contractors on the subject, and figures out that the reduction amounts to between 10 and 15 per cent. There is, after all, little change in the cost of building materials. Iron and steel products are substantially the same; there may, however, be a saving in fabrication. The only reductions which he can observe are due to the anxiety of contractors to get the work and the increased efficiency of the workmen. Labor represents about 50 per cent of the cost of a building, and it is estimated that the increased efficiency of workmen amounts to 20 to 25 per cent. Mr. Renwick considers the prospect for an active building season fairly good.

Leo G. Fisher, Chicago, manager for the Thompson-Starrett Company, states that, so far as he is able to judge, building construction is at low ebb. The reduced cost of building, in his estimation, amounts to not more than 10 per cent. He says that he would not be inclined to take contracts at the present time which they figured on last year at a reduction of 10 per cent. The margin is too narrow. He has not discovered any drop in the cost of steel, but there may be slight changes in the quotations on lumber and masonry. Their most extensive operations at the present time are in New York city and in San Francisco, particularly in the latter city, where they have in process of construction eleven buildings. He is of the impression that there is a great deal of work under cover in the architects' offices in Chicago and elsewhere ready to come out in the spring, or just as soon as conditions are more settled.

Cements and Cement Testing*

By WM. B. GESTER, C. E.

MAY I say as a preliminary that it gives me pleasure to meet with you this evening to take part in a discussion which must be of some interest to all of us, and to some of you, because of specialization in your profession in the line of concrete construction, must be of more than ordinary interest?

Because of inherent value, because of characteristics and availabilities that become more generally recognized as time passes, and because of changing conditions and requirements in the matter of building, our cementing materials have an exceeding great, and a most rapidly growing importance.

While the forests of this great country of ours were being cut away to make room for the farmers, and during the years that followed, when the rapid development of industry and rapid increase of population, and the consequent rapid growth in demand for structures of all descriptions, called for material that was cheap rather than permanent in character, wood was used for all sorts of construction.

During later years, as the wealth of the country permitted, and the economy of permanent construction became evident, while at the same time timber has become scarcer and more expensive, brick and stone and steel and concrete have been utilized to greater and greater extent in rapidly increasing proportions.

Neither brick nor stone can be utilized without the help of cementing materials, and modern developments tend to their rapidly increasing use in concrete.

Published statistics give an idea of the growth of the use of cementing materials, in the United States. From the days of the early colonies until the beginning of the nineteenth century, quick lime formed the basis of the plasters and mortars. During the construction of the Erie Canal through the State of New York, from about 1820 to 1825, the first American hydraulic cement, a natural rock cement, was made for use in that work. The production was in the neighborhood of 25,000 barrels per year. By the year 1860, this had increased to a round million barrels a year. By 1880 to 2,000,000 barrels a year, by 1890 to 7,000,000 barrels a year.

In the early seventies, the manufacture of artificial Portland cement was begun in this country, and by the year 1900, the output of Portland equaled the output of natural cement, each about 8,000,000 barrels.

Since 1900, the manufacture of Portland has increased in a manner that can only be characterized as phenomenal. In 1905 it had reached the thirty million mark, and the output of 1907 was 50,000,000 barrels. In the meantime the production of natural cement has fallen off, although four or five million barrels were made last year.

To the Pacific Coast, in greater proportion than to any other portion of the United States, there comes also a quantity of cement manufactured abroad. In our market here in San Francisco, are offered brands of cement made in Japan, China, England, France, Belgium, Germany, Denmark, Sweden and Russia.

The total imports of foreign cements during 1907 amounted to 2,000,000 barrels. Of our domestic Portlands we exported about 1,000,000 barrels. In round numbers, we are now consuming in the United States

170,000 barrels of cement every day, and this rate of consumption is increasing rapidly. The elements entering into the composition of building cements are the most common and well-distributed on the face of our planet. In the form actually used for the manufacture of Portland cement for instance, they are estimated to underlie between fifteen and twenty per cent of the area of the United States. For the purposes for which they are used, it would seem that nothing could ever be more common nor abundant nor cheap.

Our common cementing materials may be divided into three classes, limes, plasters and hydraulic cements.

Our interest is especially confined to the last of these classes, the hydraulic cements, but we will give a few moments to the limes and the plasters, to show their relations to, and their differences from the class forming the main subject of our discussion for this evening.

Limes

The raw material is limestone, more or less impure, and of various natural forms. If pure chemically, it would be calcite, or calcium carbonate, a chemical association of calcium oxide (quick lime), and carbon dioxide (carbonic acid).

In manufacture, the limestone is subjected to heat. Beginning when the heat has reached about 1400 degrees Fahrenheit, and continuing during the process of increasing the heat to 1650 degrees Fahrenheit, the carbon dioxide is driven off as gas. What is left is calcium oxide, otherwise known as caustic lime, or more commonly quick lime. Of 100 pounds of limestone 44 pounds of carbon dioxide is driven off by the heat, and 56 pounds of quick lime remain. Of the manufactured product, a large proportion is marketed as lump quick lime. The rest is processed with water or steam and sold as hydrated lime. In use, the lime is mixed with sand and water to form a paste or mortar. Its value as a cementing material depends upon the fact that the lime particles in the mortar, gradually reabsorb from the air, what the heat in the process of manufacture drove off, i. e., carbon dioxide, and the lime again becomes limestone, a solid matrix holding together the particles of sand.

The advantages of quick lime or of hydrated lime as cements are cheapness and ease of handling in construction. The disadvantages are that they are fire resistant to only a limited degree, even when perfectly hardened by the absorption of carbonic acid, and that only to the extent to which carbonic acid from the air can be absorbed through the exposed surfaces, is the paste hardened at all. The inside of a heavy brick or stone wall set with plain lime mortar may not harden for many years, or may never harden.

Plasters

With an exception to be noted later, the plasters are made from gypsum. Gypsum, chemically, is a hydrous sulphate of lime, made up of one molecule of lime sulphate and two molecules of water. In manufacture, the gypsum is subjected to heat. At 212 degrees Fahrenheit the water begins to pass off as vapor. The temperature is increased to between 350 degrees and 400 degrees Fahrenheit, at which time about 75 per cent of the water will have been driven off, and the remainder is plaster of paris, if the gypsum has been pure, or it is cement plaster, the basis of wall plaster if the gypsum has been impure.

In making what is known as hard plaster, the gypsum is subjected to a higher heat than is required for the partial dehydration which results in plaster of paris, and certain proportions of alum or borax are added to retard the setting. What is known to the trade as Keene's cement is a form of hard finished plaster made from a pure gypsum. In use as cementing materials, all of the gypsum plasters pass through the same process of induration which is a very simple one. Upon the addition of the water which is used to form the paste or mortar, the lime sulphate which in process of manufacture was deprived of its water, rehydrates and again becomes a gypsum, with all the characteristics, strength, etc., of the natural hydrous lime sulphate.

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* An address delivered before the San Francisco Architectural Club, March 11, 1908.

Roman Plaster

In the markets of the eastern portion of the United States, under the name of Roman plaster, is now being sold, a product of hydraulic limestone of certain chemical consistency, which is really a combination of hydrated lime and natural cement. It is not a mixture of these products separately manufactured, but a product of a single process using an impure limestone of peculiar quality. Being composed in large measure of a true hydraulic cement, the hardening process is not a simple one as is the case with lime or gypsum plaster, but a complex one as will be later described. Roman plaster has a number of distinct advantages. It is highly fire-resistant, and there is no loss in its use. Particles that drop from the trowel or mortar board, may at any time within several hours, be retempered and used.

Hydraulic Cements

We now come to the most important group of building cements, the hydraulic cements, which include the natural rock cements, slag cements, puzzolan, and infinitely more important than all the rest, the Portland cements.

The cementive value or quality of these products is due to the formation of entirely new chemical compounds during manufacture and in their preparation for use, and in distinction from the simple character of the hardening or indurating or crystallizing process of lime and the gypsum plasters, is decidedly complex.

In the process of manufacture, whether the raw materials employed be of one kind or another, certain chemical combinations are formed of the composing oxides in the raw materials. The addition of water to the finely pulverized product, produces disruption of these combinations (certain silicates and aluminates), and the formation of new ones, which in crystallizing form the cementing matrices. The determination of these chemical processes has been, and is now being carefully studied by cement chemists. The theory most generally accepted at present is that the cementive character of Portland cement is due to a crystallization and hardening of a combination which is a solid solution of tricalcic aluminate in tricalcic silicate, and of bi-calcic aluminate in bi-calcic silicate. Whether the hardening comes from an interlacing of spike-form crystals, or whether it comes from the gradual hardening of an amorphous, jelly-like mass of the solution, or both, is a matter but indefinitely settled, and to most of us a matter of comparatively small moment. The truth is that the development of the Portland cement industry has been for the greater part, one of practical experiment. Manufacturers discovered that certain treatment of certain raw materials, produced certain results, and years of careful trial of various proportions of, and varied treatments of numerous materials, resulted in the production of a hydraulic cementing stuff, which upon analysis was found to have certain pretty well defined limits of chemical composition, and all manufacturers of Portland cement now proportion their raw materials to produce a cement that will fall within these limits. A Portland cement will usually contain between

19% and 26% of silica,
5% and 10% of alumina,
1% and 5% of iron, and
58% and 67% of lime.

And for certain reasons to be noted later, the maximum limit for sulphuric acid has been placed at 1.75 per cent, for magnesia at 4 per cent.

As soon as it was ascertained that a hydraulic cement must contain certain elements in certain proportions varying between certain limits, many natural materials were tried, and many combinations made, and some proved successful. This was in the earlier days of the development of the industry. Nowadays with the chemistry of cement much more thoroughly understood, the matter of the availability of proposed materials for cement making is readily settled in the laboratory, theoretically by analyses, and practically by actually manufacturing on a small scale.

Portland cement has been officially defined by technical associations in Europe, and in the United States. In all important essentials these definitions agree, those of the American Society for testing materials being as follows:

"This term (Portland cement) is applied to the finely pulverized product resulting from the calcination to incipient fusion of an intimate mixture of properly proportioned argillaceous and calcareous materials, and to which no addition greater than 3 per cent has been made subsequent to calcination."

Portland cement is now made, in accordance with this definition, of various mixtures of various materials; with pure limestone and clay, or pure limestone and shale; in other cases with impure limestone containing clay, i. e., hydraulic limestone and enough pure limestone to secure the proper proportions of the necessary ingredients; in other cases with hydraulic limestones of light hydraulic qualities with a small amount of clay or shale; in other cases with a mixture of clay and marl; again with chalk and clay, or of chalk and estuary mud.

Where made of clay and marl, the marl is frequently very soft in character, coming from submerged or partially submerged lake beds, in which case the raw material is pumped to the factory, and the process varies necessarily from the dry process which is most common. Still the material when finished, answers the general definition.

In the United States, about 95 per cent of the production of Portland cement is by the dry process.

Natural Cements

These cements are made by subjecting to heat, certain impure limestones containing clay. Only sufficient heat is applied to drive off the water and carbonic acid of the rock. The product is then pulverized and is ready for use. It is lighter in weight than Portland cement. It acquires its set in shorter periods and requires much more time to attain to its maximum strength. It is a most excellent material to use in the gauging of mortar for brick-laying, making a soft, easily worked putty. For general use, in the manufacture of concrete, etc., it is not as valuable as Portland, which acquires its strength much more rapidly, and yet the bulk of all the great masonry work of the United States prior to say ten years ago, was done with American natural cement.

Puzzolan Cements

The name puzzolan is properly applied to a product made by grinding together and intimately mixing hydrated lime with certain volcanic scoriae or ashes containing silica and alumina. The principal district of manufacture is Italy. No natural puzzolans are made in the United States at present. It may be of interest to recall the fact however, that thirty years ago, the late Henry G. Hanks, for years State Mineralogist of California, discovered that a vesicular lava from the neighborhood of Tombstone, Arizona, made with slacked lime, a most excellent puzzolan, and that a deposit in the neighborhood of Mt. St. Helena in California, also made a good hydraulic cement of this kind.

Mr. Hanks made a quantity of puzzolan of these materials, with which were laid up brick walls and chimneys here in San Francisco, that stood until the great fire of two years ago, the only examples of the use of American natural puzzolans in this country.

Slag Cements

Slag cements are made both in Europe and in the United States by pulverizing together, and thus intimately mixing, blast furnace slag of proper chemical consistency, with hydrated lime. The slag while still in molten state is drenched with or plunged into water, which action granulates it, and causes it to retain certain chemical properties necessary to the hydraulicity of the finished product, which properties are lost if the slag is permitted to cool slowly. The slag is then mixed with the proper proportion of dry slacked lime and pulverized in ordinary tube mills. Slag cements are pulverized more finely than Portlands. They do not test so high as Portlands, for either tensile or compression strength, and they are comparatively deficient in resistance to abrasion, and therefore not fitted for sidewalk or pavement or other wear of abrasive character. They are, however, well suited to heavy construction in sea water, and for underground work where continually exposed to moisture.

The Manufacture of Portland Cement

Inasmuch as more Portland cement is manufactured from limestone and clay than from any other combination of materials, and as the proportion of this class of manufacture is steadily increasing from year to year, we will select an up-to-date plant using this process, to illustrate manufacture.

The plant is located as nearly as may be to its supply of raw material. The limestone is broken from the quarry and passed through a large gyratory crusher which breaks it to pieces having a diameter of 4 inches. This is loaded upon cars, and with the clay, taken from its bank or pit, and loaded upon other cars, is hauled to the weighing room of the plant. Samples of the materials have been analyzed in the laboratory which forms a very essential portion of the plant, and the chemist in charge has computed the correct proportions of each to be used.

Inasmuch as no single cubic foot of either material is exactly like its neighboring cubic foot in composition, and as the differences may vary every hour of the day and night to a greater or less extent, the laboratory is continuously busy that endeavors to turn out an approximately uniform product. The attendant at the scales weighs out the proper proportions of each material as directed by the chemist. The scales are track scales, and the materials are weighed in the cars, the loads being "trimmed" to proper weight. The loads are dumped together over a set of grizzlies and through a series of revolving steel arms by which the materials receive their initial mixing, before reaching a second crusher, which breaks all the material to 2-inch sizes. The mixture thus broken is carried by an incline belt to a "raw material" store-house having a capacity of 25,000 or 50,000 tons. Under the floor of the raw storage building is a system of automatic feeders, feeding the mixture to conveyor belts which take it to the driers. This system is arranged to keep the mix complete and homogeneous. The driers are rotating steel cylinders, 7 or 8 feet in diameter and 60 feet long, and heated by the most available fuel. Here the mixture is deprived of any moisture it may contain, and is carried to a set of bins, ready to undergo the preliminary pulverizing. This is done in ball mills. These are steel cylinders revolving vertically about shafts provided with dust-proof casing. The cylinders are internally fitted with overlapping steel shelves or steps, and the grinding of the material, fed at the shaft, is done by steel balls which with the revolutions of the mill, fall against each other and over the steps. Each mill will have a charge of from 3000 to 5000 pounds of the steel balls, and its capacity will be from 16 to 24 barrels per hour, all pulverized to pass a 20-mesh screen. This 20-mesh material is then carried by belt conveyors or elevators to the bins supplying the finer pulverizers, the tube mills.

These latter are steel cylinders rotating by means of hubs at the center of their extremities. They are from 5 to 7 feet in diameter, and from 20 to 24 feet long. The grinding here is done by subjecting the charge of raw cement material to the impact of a lot of smooth flint pebbles against each other and against the chilled linings of the tube, caused by the rotating of the cylinder. The raw material is fed in at the center of one end of the tube mill, and is discharged ground at the other end. The capacity of the large size tube mill used in a modern plant, is about 600 barrels per 24 hours of a product of which 95 per cent will pass the 100-mesh screen. A very large proportion of the product, from 70 to 80 per cent will pass the 200-mesh screen.

The utmost care has been exercised by every means at the disposal of the manufacturer to maintain a perfectly proportioned mix of the raw material from the time it was weighed and dumped into the first mixing device until it has entered the tube mills. Not only must the physical combination of the lime and the clay (or shale) be kept uniform, but in this particular part of the process, extreme care must be taken to pulverize the raw mixture most thoroughly.

The clay frequently contains a portion of uncombined silica in the shape of sand. It resists pulverization stubbornly, but must be reduced to permit later chemical combination. The particles of limestone must be pulverized to the limit required, or in the clinkering process there will be particles too large to enter into chemical combination, and in the cement after finishing, will be particles of lime oxide (quick lime), which render the product unsound and while in that condition absolutely unfit for use. In the tube mill, therefore, if the work has been properly done, the mix has become exceedingly intimate, a very necessary condition, for the next step in the process toward the manufacture into cement, i. e., the burning.

The burning to produce a good product must be evenly carried on throughout the mass to a point of incipient fusion, producing a clinker in which the original ingredients have changed form and have entered into new chemical combinations, principally into bi-calcic and tri-calcic silicates and aluminates. Any carelessness in the application of the heat, either in intensity or in length of time of application; any lack of judgment in this portion of the process; any misfortune, possible to foresee, or impossible to foresee, is apt to result in an undesirable clinker, a clinker which in the subsequent process of pulverization will not make an acceptable cement.

In all modern cement plants the burning is accomplished in rotary kilns. These are great steel cylinders, lined with fire-resistant material, clay firebrick generally, but of other material where necessary. This lining must be not only highly fire-resistant, but must withstand the highly destructive action of the constantly moving mass of clinkering material. These revolving cylinders, the rotary kilns, are from 60 to 150 feet long and from 5 to 7 feet in diameter. They are set on an incline to the horizontal of about ¾ of an inch to the foot. The fuel used for burning varies with localities. In districts where coal is plentiful and cheap, in the Lehigh cement district of Pennsylvania and New Jersey for instance, pulverized coal is used. In the Kansas cement district, and in other portions of the Middle West, natural gas is used. On the Pacific Coast, oil is of course the economical fuel.

The raw mix is fed continuously by an automatic feeder arrangement into the kiln at its upper end, while the fuel is injected at the lower end. The kiln is slowly revolved upon geared bearings, and the mix is continuously turned and heated to increasing temperatures, and gradually carried to the lower end of the kiln, where it is discharged as cement clinker. As it is discharged it is at red heat. The next process is the cooling. This also is done mechanically, the devices for the purpose varying considerably. An excellent and much-used type is the "tower cooler," a vertical cylinder from 30 to 35 feet high, and from 8 to 10 feet in diameter. To the top of the tower the hot clinker is conveyed by bucket elevator, and sprayed with water. The clinker is cooled in its descent through the tower by a cold air blast furnished through a perforated pipe running up through the center of the tower, and maintained by an electrically driven fan. The clinker upon leaving the cooler has been reduced to a temperature of about 100 degrees Fahrenheit and is now a mass of hard particles of a greenish black color, showing evidences of partial fusion, and ranging in size from a small fraction of an inch to an inch or more in diameter.

In most of the later designs of cement plants, the next step provided for is the clinker storage. Clinker that has been permitted to lie in piles where it can absorb moisture and carbon dioxide from the air is affected in several respects. The hard, glassy material becomes brittle, and the subsequent pulverization is materially facilitated. Uncombined lime particles have become hydrated and carbonized, and therefore inert, where otherwise they would be dangerous as the principal elements of unsoundness in the finished product. The clinker yard may be covered or uncovered depending upon climatic conditions. In any event it furnishes a more economical storage of material than the more finished structures required for storing the finished cement.

All of the process of cement manufacture as described, as far as the burning, is done on what is familiarly known as the "raw side" of the plant. From the clinker yard, the material takes its way through the "finishing side" of the works.

The first step is to dry the clinker. This is done in a rotary cylindrical drier in which all moisture is extracted and the material prepared for mixture with the "retarder."

All ordinary cement clinker, if pulverized into cement, and mixed with water without any other addition, will begin to crystallize or take a "set," as it is called, immediately, so rapidly as to be unfit for practical use. It has been discovered however that the addition of a small percentage of lime sulphate, in the form either of gypsum or of plaster of paris, or the addition of a small quantity of lime chloride, will without effecting the strength of the cement, retard the time of setting so as to render it possible to use it for all necessary building purposes. Generally speaking, the addition of from 1½ to 3 per cent of lime sulphate acts as an efficient retarder. Higher percentages will have a less retarding effect, and are also otherwise deleterious.

Where lime chloride is used, ½ per cent is sufficient. The practice of adding a retarder is necessary as a part of the process of manufacture, and not to be considered in any way as an adulteration. The retarder may be added at any time in the process of finishing, the only requirement being that it shall be thoroughly incorporated.

When added before grinding (the method usually followed), gypsum is used. When added after grinding, plaster of paris must be employed. The active retarding agent in either case is the anhydrous sulphuric acid contained in the lime sulphate. In America, gypsum is used entirely, and is added to the clinker just before entering the first of the grinding devices on the finishing side of the plant. The gypsum and the clinker are mixed automatically, and the mixture is elevated to the ball mill bins. From the latter it is automatically fed to the ball mills. These are identical in type and generally also in size to those on the raw side of the plant already described. They grind the clinker to about 20-mesh size, and the product is again elevated to be fed to the tube mills. These also are of the same size and type as are used on the raw side, and have a capacity of about 20 barrels per hour each, grinding the cement to the fineness required by ordinary or standard specifications.

The product is now finished, and is carried to storage bins in structures designed for the purpose by means of screw conveyors. In some plants the storage waterhouses are divided into bins containing from 1000 to 2500 barrels, which bins may be closed and sealed for the convenience of careful purchasers who buy in lots of such size, and who require that what they buy shall prove by actual test to be up to their requirements as to strength and other necessary qualities.

From the storage bins the cement is carried by elevators and conveyors to the packing house where it is barreled or sacked for distribution.

In this country only such cement is packed in barrels as is exported. All the rest is marketed in jute or cotton sacks, which specifications require shall hold 94 pounds net (4 sacks to a barrel of 376 pounds net). Foreign cements coming to the American market are in barrels which should weigh 400 pounds gross, and should contain also 376 pounds net. As a matter of fact, they vary considerably.

Conditions are such that it is impossible to profitably manufacture Portland cement in a small way. The unit of economical manufacture is the possible output of two rotary kilns or say 1000 barrels per day. The plant necessary for this output, will cost about $350,000. A working capital of about $150,000 is also necessary, so that a capital of at least a half million dollars is required to safely embark in the business of manufacturing and marketing Portland cement on the smallest workable scale. I bring this matter up incidentally to show that the business is essentially an important and imposing one at its smallest.

Cement is a bulky product, and must be and is handled by automatic, mechanical device wherever possible. No manufactured product, in order to insure its reaching the consumer in its integrity, must in the course of its manufacture, be more wisely and carefully handled. By the unaided human senses, it is utterly impossible to distinguish good Portland cement from that which may be worse than worthless, or for that matter from a pulverized rock which has no cementitious qualities whatever. Men pretend by sight, by handling, by taste and by smell to be able to judge of the value of Portland cement, as they may safely do to a certain extent with other building materials, but the pretense is without good foundation.

No one of the senses, nor all combined, will determine the unsoundness or the soundness of a cement, nor its setting qualities, nor its strength and each of these qualities may be lacking in a cement by reason of a few moments carelessness in the laboratory of the plant before the raw material has taken the first step in its progress, or in the plant itself during any of the succeeding steps of that progress as just described. Timber you may tell much about by its appearance, steel you may tell something about, cement, almost nothing.

Mistakes in the manufacture of steel are continually made and are covered up, and the material shipped and used, and this occurs in mills all over the world, and generally speaking it is not the mill management which is responsible, but it is the guilty fault of department superintendents and foremen who cover defects and save themselves from reprimand or dismissal. In like manner, slips occur in the manufacture of cements in mills all over the world, and large quantities, lacking in one essential quality or another are continually placed upon the market.

It is true that some plants are more frequently guilty of these slips than are others, but it is equally true that they may occur and do occur in every plant, and that they are not always discovered before the cement reaches the consumer; so that the dictum of the American Society of Civil Engineers embodied in the first paragraph of their "Conditions" regarding Portland cement testing, is founded upon good and sufficient reasons. This first "Condition" is as follows: "All cement shall be tested."

This as an introduction to the last portion of my talk to you this evening, which has for its subject the "Testing of Cement."

That cement is a good cement which mixed with water in proper quantity, and with the proper inert aggregate material (sand, gravel or stone), will harden into a mortar or concrete of permanent, requisite strength. Mixed with the same proportions of inert material, or aggregates, various cements require various amounts of water in the gauging or mixing to accomplish best results. The American Society for the Testing of Materials, in its most excellent standard specifications, adopted in 1904 recommends for the gauging of test briquettes of neat cement, just sufficient water to bring the cement to what is known as "normal consistency," and specifies the minimum limit of strength which this gauging should secure at various ages of the briquette. It is an eminently fair test for a large class of most excellent cements, but not fair for another large class of most excellent cements, some of them made in this country, and some in Europe, which do not so rapidly assimilate water in the earlier stages of induration, and which gauged according to American Society specifications, do not always show the required strength in the twenty-four-hour test, although they may approximate or fully reach it in 7 days, and easily surpass it in 28 days. It is likely that at its next meeting the American Society for the Testing of Materials will be asked to change its recommendation, either as to quantity of water to be used for gauging, or its recommendation as to minimum strength of neat briquettes at 24 hours and 7 days. And after all is said and done, it is the result of the sand or mortar tests at 7 days and at 28 days, that enable the engineer to decide upon the suitability of a cement for the work he has in hand.

Specific Gravity of Portland Cement

The American Society Standard Specifications provide that, "the specific gravity of the cement, thoroughly dried at 100 degrees centigrade shall not be less than 3.10.

It was supposed at the time of its adoption that this test was useful in detecting adulteration and underburning. A careful series of experiments made by Messrs. Meade and Hawk, led them to the publication of the following conclusions in the Chemical Engineer for last July: "That the requirements for specific gravity" should be omitted from the standard specifications. Or at least that the clause which infers that low specific gravity is caused by underburning and adulteration should be omitted and that in its place one stating that low specific gravity may but does not necessarily imply adulteration, as it is in most cases due to seasoning of the cement or storage of the clinker before grinding, both of which are beneficial to the product."

Similar conclusive results have followed similar experiments in other laboratories, the matter has been generally discussed among cement chemists, and the demand for the cutting out of the specific gravity test will probably find no opposition.

Fineness of Cement

The American Standard Specifications provide that "the cement shall be so finely pulverized that at least 92 per cent shall pass a standard screen with 100 meshes to the lineal inch (10,000 perforations to the square inch), and at least 75 per cent shall pass a standard screen with 200 meshes to the lineal inch (40,000 perforations to the square inch).

Formerly the requirements were much less severe, and cement is being more finely ground today than ever before, more finely in many cases than the Standard Specifications demand. As a matter of fact, the cementitious value of a cement increases with the percentage of clinker which is ground to an impalpable powder. That portion which will pass the 100-mesh screen, and remains upon the 200-mesh screen, has almost no value except as a fine aggregate. It is inert except for the film of dust that may cling to the particles. This point being recognized, it is readily understood that the finer a cement is ground, the stronger it will be in use, mixed in mortar, or the larger proportion of sand it will take and produce a mortar of given strength. It is also true that the finer the particles of cement are, the more readily and quickly will take place those chemical changes, and the final crystallization which give Portland cement its character and value. Another point in favor of fine grinding is that any particles of uncombined lime there may be in the clinker, are more readily and quickly hydrated and rendered harmless.

Time of Set

The American Standard Specifications provide that a paste of cement mixed to "normal consistency," with water, shall develop "initial set" in not less than 30 minutes, but must develop its final or hard set in not more than 10 hours.

"Initial set" is recognized as the time at which the mass of paste begins to offer appreciable resistance to pressure or puncture, and "final set" when the resistance is of such a character that further pressure will cause the mass to break.

The subsequent increase in resistance to external force is termed hardening or induration of the cement, and is another matter. The time of set is a matter of practical value to the cement user as it fixes the rapidity with which he must work in the making of mortar or concrete. Therefore the set should be slow enough to permit reasonable time for mixing and placing, and should be as rapid as possible after that point, in order to expedite the work. As previously described, the time of set is fixed, during process of manufacture, by the addition of a retarding agent, the ordinary pulverized clinker in its pure state having a "flash" set.

A peculiarity as yet not thoroughly and satisfactorily accounted for in the matter of "set," is that, occasionally, freshly made cement will test ordinarily slow, and after a few weeks seasoning will show much quicker set. Strangely enough, too, just the opposite change will sometimes occur, and cements which are, when freshly made, fairly quick in their set will become slow setting; and not infrequently a cement will begin as a quick setting cement, and then become slow, and still later quick again. Theories have been offered in explanation of these changes but none have been universally accepted. The tests so far touched upon, although decisive of very important questions regarding certain qualities of cement, are secondary to those fundamental ones which we shall now consider, the tests for strength and for soundness. The strength test provided for in almost all specifications, is that for tensile strength. In itself the test would be of little use, since cement and concrete are not usually obliged to sustain strains of tensile character. The tensile test is usually specified however, because it can be much more conveniently, and less expensively made than a compression test, and because it affords within practical limits, a method of determining the compression resistance. Extensive experiments show that the resistance to compression is from 8 to 12 times the resistance to pull, and it is safe to use the factor 10 for all ordinary computations.

The method used for ascertaining the tensile strength is about the same in Europe and in this country. The American Standard Specifications provide for the making of briquettes of certain definite size and form, the neck or breaking portion of the briquette having a section of one inch square. The briquettes are placed under strain in machines manufactured for the purpose which register the amount of pull at the breaking point.

Directions for the making and the breaking of test briquettes are recommended by the specifications of the American Society of Civil Engineers, and they are followed more or less closely by cement testers throughout the country. Nevertheless, variations of treatment and of results are possible even under the most minute directions that can be given, and the "personal equation" can always be relied upon to make itself evident. As between capable, experienced testers, and inexperienced incapable ones, there is a very marked difference; all the difference between certainty and safety on the one hand, and uncertainty and danger on the other.

Specifications require that the test briquettes shall be made of neat cement paste, and of sand mortar, the latter generally in the proportion

of one part of cement to three parts of sand. The material is placed in the molds as compactly as possible. Laboratories differ in the details of manipulation as has been explained. Formerly, machines giving hammer blows to the material in the molds were used to some extent. They conduced to accuracy, but being slow, the small increase in accuracy did not pay for the time expended.

As soon as made, the briquettes are marked with their proper laboratory numbers, and kept for 24 hours in a moist atmosphere, at a temperature of about 70 degrees Fahrenheit. The moist, even tempered air is maintained in a box or small apartment known as a "damp closet." After the briquettes have hardened for 24 hours in the damp closet, they are removed from the molds, and placed in water in shallow tanks where they remain until time for testing them has arrived.

Two types of machine for testing standard briquettes are in general use. In one type the load is applied by hand through screw and gear, while in the other it is applied by the automatically regulated running of fine shot. Each type has its points of excellence, and either will give sufficiently accurate results for all practical purposes.

The number of briquettes broken to establish average strength, and also the age at which the briquettes are removed from the tanks for test, depends upon the range of information required and the accuracy desired. Usually briquettes of neat cement are broken at 24 hours, 7 days and 28 days. Less frequently the tests are made to cover various other periods from 60 days to 20 years. Sand or mortar briquettes are seldom broken until after 7 days in the tanks.

Tests for crushing strength are made with cubes or prisms having a horizontal cross-section of 6 inches or 8 inches square, and are usually made of materials mixed just as they are intended to use in the work.

The requirements of the American Standard Specifications as to tensile strength are as follows:

"The minimum requirements for tensile strength for briquettes one-inch square in section shall be within the following limits, and shall show no retrogression in strength within the periods specified:

NEAT CEMENT.

Age.	Minimum Strength.
24 hours in moist air	150-200 pounds
7 days (1 day in air, 6 days in water)	450-550 pounds
28 days (1 day in air, 27 days in water)	550-650 pounds

ONE PART CEMENT, THREE PARTS SAND.

Age.	Minimum Strength.
7 days (1 day in moist air, 6 days in water)	150-200 pounds
28 days (1 day in moist air, 27 days in water)	200-300 pounds

You will note the provision that the tests shall show no retrogression in strength within the periods specified, i. e., the 28 day results must always be higher than the 7 day, and the 7 day higher than the 1 day. Any extensive retrogression is reason for rejecting a cement, and if the sand or mortar briquettes show any retrogression at all, the indication so strongly points to an ultimate failure of the cement, that it should be rejected.

Soundness

The last, though not the least important test is that which determines the soundness of a cement. A sound cement will permanently maintain the solidity and strength which come through its crystallization, and consequent induration. An unsound cement will, because of some inherent defect, first set and crystallize, and then disintegrate. No defect therefore can be worse than unsoundness. The defect usually comes from a proportion of uncombined free lime in the cement. The tests provided for detecting possible unsoundness are as follows:

"Pats of neat cement about 3 inches in diameter, ½ inch thick in the center and tapering to a thin edge, shall be kept in moist air for a period of 24 hours.

(a) A pat is then kept in air at normal temperature and observed at intervals for at least 28 days.

(b) Another pat is kept in water maintained as near 70 degrees Fahrenheit as practicable, and observed at intervals of 28 days.

(c) A third pat is exposed in any convenient way in an atmosphere of steam, above boiling water, in a loosely closed vessel, for 5 hours.

These pats, to satisfactorily pass the requirements, shall remain firm and hard and show no signs of distortion, checking, cracking or disintegration."

Disastrous as the use of an unsound cement may be; and nothing can be worse since it means utter ruin, still a cement which the tests prove to be unsound, will generally, if stored for a few weeks (the more loosely stored the better), become sound and safe. The free lime will become hydrated, and so, inert.

Like Liberty, good Portland cement has a value that is beyond computation, and like Liberty, it has its price, which is eternal vigilance.

From the quarrying of the first piece of the raw material, through all the close processes of its manufacture, until it emerges, the most wonderful and vaulable product, except its running mate, steel, that the crust of old earth gives to the builder, it must be watched and guided, with intelligent, zealous care. It is an essentially modern product, requiring in its use, knowledge and care to attain those most wondrous possibilities of which it is capable. This knowledge, however, is not difficult to acquire, and I am more than pleased if I have in this evening's talk, given some small help toward an understanding of points which had not come to your notice, or having been known, had slipped from memory.

* * *

Opportunity for Concrete Blocks

THE present conditions offer an opportunity for concrete block manufacturers and others to make a comparative estimate of cost, using their goods and other materials for the construction of residences, which should redound to the credit of the blocks and should afford profit to the blockmakers. If the last phase is overlooked or ignored or slighted in any degree, the work is vain. Block men have made serious mistakes in the past in placing their total cost of production too low, and have priced their blocks too low in consequence. The result has sometimes been a strong temptation to make it up by taking some value out of the blocks, a process as reckless as it is unwise. The blockmaker who does not try to put the fullest and best value into his blocks is working on the wrong lines and on the wrong business. A skinned job in blocks is more likely to announce itself to the public than perhaps in any other line of construction. The adverse effect upon future business, the wrath of the owner and the talking point afforded competitive lines of construction will all follow such an unwise course.

Hence the foundation must be good, honest work and sufficient materials of the right kind. Starting from that point, there should be due allowance made for every item of expense which enters into the business. —Improvement Bulletin.

Among the Architects

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Annual Meeting of the State Board of Architecture

On April 14-15th the members of the Northern section of the State Board of Architecture were entertained by the Southern section at Los Angeles. President Henry A. Schulze, Secretary Lionel Deane, Clinton Day and William Curlett were the guests, and they report a delightful trip. The San Franciscans went south to attend the annual meeting of the two bodies. Tuesday night, April 14th the visitors were guests of Southern California Chapter, A. I. A., at their regular monthly meeting and dinner at the Bristol Cafe. About thirty-five members and guests were in attendance. The president of the chapter, Mr. C. H. Brown, announced that Mr. Alfred F. Rosenheim would act as toastmaster. He responded in his usual happy vein, and called on Theo. A. Eisen, who made the welcoming address. Responses were made by H. A. Schulze, John P. Krempel, Lionel Deane, Octavius Morgan, F. L. Roehrig, J. J. Backus, A. B. Benton, S. P. Hunt, Myron Hunt and R. B. Young.

In the afternoon the business meeting was attended by nine of the ten members of the State Board. Those present were Henry A. Schulze, president, San Francisco; John P. Krempel, vice-president, Los Angeles; Frederick L. Roehrig, secretary and treasurer, Pasadena; Lionel Deane, assistant secretary and treasurer, San Francisco; Octavius Morgan, Los Angeles; William Curlett, San Francisco; Sumner P. Hunt, Los Angeles; William S. Hebbard, San Diego, and Clinton Day, San Francisco.

Matters of importance regarding the operation and effect of the law under which architecture is practiced in this state formed the principal topics of the session.

During the day the visitors were escorted about the city and were shown the manufacturing and residence districts.

Exhibitions

International Architectural Exhibition, to be held in connection with the Eighth International Congress of Architects, May 18 to June 14, 1908, in the halls of the I.. R. Gartenbaugesellschaft, Vienna I., 12 Parkring, Austria, under the patronage of His Majesty the Emperor.

The Viennese Committee of the Congress has generously assigned to the American section of the Permanent Committee a separate room, 36 feet by American Section of the Permanent 54 feet, for an Exhibition of American Architecture.

It is the desire of the American Committee to have as representative and creditable a display of the work of the architects of America as possible.

To this end the Committee has asked the presidents and secretaries of the various chapters of the American Institute of Architects to lend their aid by serving as subcommittees for the collection and selection of drawings, etc., in their localities.

Toward the success of this exhibition the co-operation of our architects is cordially invited.

Is New President

George F. Ashley, a member of the senior class of the University of California, has been elected president of the new architectural association of the university, which was organized to promote the study of architecture.

More than twenty-five students of the college of architecture, of which Prof. John Galen Howard is the head, have joined the society. The meetings will be held semi-monthly.

When the architectural building is enlarged the association will arrange for lectures by prominent artists and engineers for the benefit of study.

San Francisco Today

Two years ago the 18th day of last month San Francisco was practically wiped off the map by fire which left nothing of the wholesale and retail districts, while the greater part of the residence districts was in ruins. San Francisco in two years has acquired more skyscrapers than it had hoped to have in many years to come; its modern steel-frame office and hotel structures have probably as much cubic feet of space as the aggregate of the former buildings. Business is again in its wonted channels, its population, nearly as large as before the fire, is comfortably housed, and the excess, or overflow population still living in the suburbs across the bay in Marin and Alameda counties, and down the peninsula more than make up the difference in what the population lacks of being as large as that of 1896.

Coming down to demonstrable facts, San Francisco has been rebuilt, so far as the rebuilding has done, with its own money, excepting a few millions that came in from the East. The total amount of building permits issued by the Board of Public Works since the fire is $102,186,517, but, as is well known to the builders, the statements of estimated cost of buildings made for the purpose of getting permits and forming a basis for building fees, falls at least 15 per cent below the actual cost, and in most instances the buildings have gone far higher. With 15 per cent added, the total amount of permits issued in the last two years is $117,514,494.

According to statistics prepared by the California Promotion Committee, which organization, by the way, has done excellent work in supplying the world with reliable industrial and building information since the fire, there are 200 new hotels in the burned district. The bank clearings of San Francisco from the fire up to April 17, 1908, amounted to $3,877,562,200.29. The total postal receipts of the city in the same period were $3,299,167.02. Though there were predictions to the effect that the terrible destruction of property by the fire would result in financial panic, and banks would be compelled to foreclose on mortgagors in great numbers; and also that mortgagors could not possibly pay interest and come out of their difficulties successfully, yet there have been practically no foreclosures of mortgages since the fire. This, to financiers, is one of the most wonderful demonstrations of recuperative forces known to history.

Plans for Territorial Prison

Architect Thornton Fitzhugh of Los Angeles has had his competitive plans for the proposed new territorial prison buildings to be erected at Florence, Arizona, accepted by the Territorial Board of Control. Eight different sets of plans were submitted but those of Mr. Fitzhugh were considered the most important as they possessed many new features, especially in the grouping and arrangement of the different buildings.

The general scheme provides for an exterior wall built in the form of a square, 600 feet from corner to corner, forming an enclosure within which will be erected (1) machinery building; (2) cell building; (3) civil building; (4) building for commissary stores, bakery, dining room and kitchen; (5) hospital with dispensary, nurses' quarters, etc.

In the center of the enclosure a large concrete ventilating stack will be built enclosing a steel smoke stack; and around this will be constructed the machinery hall, an octagonal-shaped building forty-eight feet in diameter. This building will contain the electric lighting and steam plants, refrigerating and ice machinery, etc. Extending out from this central building like the spokes of a wheel, will radiate the several buildings mentioned. Each will be one-story high and built of reinforced concrete.

Seattle Architectural Exhibit

The committee in charge of the architectural exhibit which is to be held at Seattle this month under the direction of the Washington State Chapter of the American Institute of Architects, predicts one of the best displays ever held in the West. W. M. Somervell, chairman of the committee, stated that between 700 and 800 exhibits are assured.

One of the features of the display is expected to be in the exhibits made by the leading architectural schools of the country. Cornell university architectural students are expected to send an exhibit. The Boston Institute of Technology and University of Pennsylvania school of architecture, as well as several other leading institutions, are also arranging to contribute to the coming exhibition.

Mr. Somervell announces that there will probably be at least 100 drawings from Portland and between thirty and forty from San Francisco and Los Angeles.

Seattle Has Architectural Club

For the purpose of securing closer relations between the draftsmen and architects and also for the purpose of raising the standard of draftsmanship, the draftsmen of Seattle have organized a club with a membership of about thirty-five and the following officers: G. C. Stanley, president; Gordon Turnbull, secretary; C. C. Ziegler, vice-president; George Gove, treasurer. The club has engaged quarters in the old University building. Meetings are to be held twice a month. Lectures are to be given from time to time by the leading architects and engineers of the city. A course of problems will be shortly undertaken, conducted in the same fashion as the school of fine arts at Paris. Watercolor and other features of architectural work will also be studied.

Seattle Chapter, A. I. A.

At a special meeting of the Seattle Chapter of the Washington Institute of Architects it was decided to conduct a vigorous campaign to secure the passage of the proposed charter amendments, particularly the one indorsed by local architects providing for a board of appeal to pass on building questions. The architects propose to try to induce the various candidates for office, regardless of party, to mention these amendments in campaign speeches.

Reinforced Concrete Building

On the site of the old California Market, in the block bounded by California, Pine, Kearny and Montgomery streets, San Francisco, a new California Market is about to arise which will far surpass the former crude structure. The owners of the land, F. G. Drum, J. B. Haggin and William Tevis, have approved the plans of the architect, Hermann Barth, for a building which will embody all the latest ideas on markets.

The new California Market will be but one story in height, its owners having selected the pavilion plan, but the roof will reach the height of the average two-story or three-story structure. It will have a deep basement, with heavy concrete floors, walls and columns, and, indeed, the entire structure is to be in reinforced concrete. The superstructure, its walls, columns and roof will be of the same material. The fronts on Pine and California streets are to be finished in cream glazed tiles, with copper cornices, all being worked out in a classic design. The floors of the aisles will be tiled, and the interior of the walls and the columns will be covered with cream glazed tiling. All fixtures in the market must be of uniform size and design, in accordance with plans of the owners.

Of Interest to Architects

The program for the last "at home" at the Y. W. C. A. at Portland was rather different than usual and exceedingly interesting. Architect E. B. MacNaughton gave an illustrated talk on "Architecture," showing by means of a choice collection of slides the history and development of this science from Egyptian to modern times. Mr. MacNaughton is the architect for the new Y. M. C. A. and Y. W. C. A. buildings.

Mr. Robert A. Cummings, M. Am. Soc. C. E., has moved his offices from 4 Smithfield street to 316 Fourth avenue, Pittsburg, Pa.

Architect E. S. Lemme announces his removal to new offices in the James Flood building, San Francisco.

Watt a Question

Teacher—Our ancestors lived in the Stone Age. What age are we living in?

Scholar (promptly)—The Volt-age.—Electric Wire.

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OUR STATE ARCHITECTS

There seems to be good ground for the criticism in different parts of California anent the Department of State Architecture. The employment of a State Architect is comparatively a new departure, the last Legislature having seen fit to create the office with a view, no doubt, to insuring proper supervision of state buildings, and at the same time reducing the cost of maintaining the department. Heretofore drawings for state buildings were offered in competition and the usual architect's percentages were allowed the successful competitor.

Somebody argued to the legislators that it would be economy to create the office of State Architect, pay a fixed salary and thus limit the expenses of the department to a stated sum. Politics helped the bill through and just how satisfactory the experiment has proven one need only to inquire of the various heads of state institutions who have been wrestling for two years with the State Architect trying to get something. President Daily of the Normal school, San Jose, Dr. Stocking, Supt. of the Insane asylum at Agnew, and other heads of equally prominent state institutions, report exasperating delays and seemingly inexcusable blunders on the part of the State Architect's office.

According to President Daily the drawings for the Normal school have had to be changed repeatedly so as to include all features necessary to make the institution complete in every detail. The frequent changes have seriously delayed the work of construction, nothing whatever having been accomplished aside from wrecking the old buildings—and it is more than two years since the old structures were rendered uninhabitable by the earthquake.

What makes the situation the more exasperating and intolerable is the fact that the State Architects are competing for outside work. This is not only an unfair deal to the taxpayer but it is taking advantage of a high office to defeat the other fellow who tries to get his plans through for a school house in his own town. If there is not sufficient money in public office to satisfy the incumbents without seeking private work, it would seem better to resign. The two will not go hand in hand, at least not while there is so much state work to be done as at the present time.

ALERTNESS PAYS

Alertness pays, says an exchange. We quite agree. It pays the employer and it pays the employe. It increases results without increasing expense. Laggards are a constant drag on efficiency. The salesman who receives instructions listlessly, and executes them without enthusiasm, earns little himself and sets a bad example to his fellows. The salesman who hears correctly, thinks intelligently and acts quickly, is an inspiration. He quickens the pace of the whole organization. To such a man is due credit for part of what the others accomplish, as well as for what he accomplishes himself.

Appearance is not everything, but it is much. People naturally shun a shop where the clerks seem to be tired and bored. They like to be waited on by attendants who are interested in them and in what they want to buy.

Especially is it up to the manager to be alert and to require alertness—to insist on prompt, definite answers to questions and on reports that are concise and clear—and to set the example by issuing orders that are simple in form and positive in substance. Alertness pays.

SANDSTONE AND GRANITE MAKE DISMAL SHOWING IN FIRE TEST

The architect with the best interests of his client at heart is surely beginning to appreciate the fact that sandstone and granite are very poor building materials from a fireproof standpoint. At least there is little to be honestly said in favor of either material after eliminating their esthetic value.

Heretofore the United States government has shown a tendency to favor natural stone in the construction of its public buildings. It remains to be seen what course Uncle Sam will follow now after the startling report of Engineer Richard L. Humphrey in charge of the structural materials laboratories of the geological survey. The tests were conducted at the Fire Underwriter's laboratories in Chicago and were made possible by the cooperation of the National Board of Fire Underwriters and the National Fire Protection Association.

Concrete, stone, brick and terra cotta were subjected to the direct application of heat for two hours and were then immediately cooled with water. Here are some of the facts brought out and they should be sufficient to make the careful architect sit up and take notice:

Brick panels withstood the test better than any other materials. The hydraulic pressed brick stood the test exceedingly well. No damage was apparent whatever after the firing and before the water was applied, and although a number of the bricks cracked 70 per cent of them were found to be sound after quenching.

The natural building stones behaved worst of all the material tested. The almost complete destruction of these stones precludes any comparison between them. The SANDSTONE PANEL ENTIRELY COLLAPSED soon after the test was started.

The test of reinforced concrete was very satisfactory. The damage in no case extended far into the concrete, probably not more than one and a half inches. The evidence shows that even at this depth, the temperature was comparatively low. The tests brought out most clearly the low rate at which the heat travels through concrete. "This," concludes Director Smith in his report, "is unquestionably one of the desirable qualities in materials intended for fireproofing purposes."

Modern

Constable—"Come along; you've got to have a bath."

Tramp—"A barf! What, wiv water?"

Constable—"Yes, of course."

Tramp—"Couldn't you manage it wiv one o' them vacuum cleaners?"—Tid-Bits.

LIGHTING AND HEATING

As Applied to Buildings

Public Lighting and Public Spirit

By E. L. Elliott

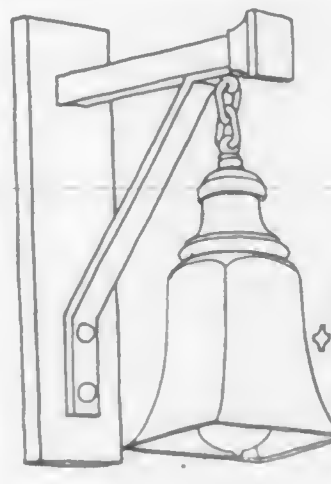
In the Illuminating Engineer

STREET lighting became a generally recognized public utility with the introduction of illuminating gas; the electric light demonstrated the possibility of so lighting streets that they become objects of general attractiveness,—an expression of the public spirit of the city.

It is no mere figure of speech to say that a city is known by its lights. Dark streets are invariably empty streets at night, and the stranger flees the unlighted town.

New York, the metropolis of the western hemisphere, has many attractions for the stranger within her gates. There are parks of every description; theatres and opera houses innumerable; museums and public libraries; churches and cathedrals; but of all these numerous attractions, which one is best known to the average American? The "Great White Way," that stretch of Broadway, about a mile in length, from 23d to 46th streets. Here are displayed a greater number of lights, more expensive and elaborate illuminated signs, and a more dazzling brilliancy than in any other thoroughfare in the world. Consider for a moment what it would mean to property owners in this section if all these lights were extinguished!

What this spectacular lighting does for Broadway, it will do to a proportionate extent for the principal business street in YOUR town. As a mere matter of municipal investment there is nothing that will bring such sure returns as the attractive,—yes spectacular, if you please,—lighting of the business streets of a city.



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Lighting of this kind reflects credit upon, and gives prestige to the entire city, and is therefore a work in which all should be interested. By giving assistance in the way of favorable rates and engineering skill, the lighting companies can show that they have the general welfare of the town in view. By a liberal use of spectacular lighting the merchants can give a general air of prosperity to the town, which will be reflected in increased trade. the citizen can, and will, show his appreciation of this public spirit by giving his patronage to his home merchants instead of taking it to other cities.

Public enterprise is contagious, a single block, or even a single building brilliantly lighted and outlined is sure to spread to adjacent blocks.

There is but one city that does not need illuminating, and that is the city of the dead—the graveyard.

Light up, and keep lighted up!

The Age of Light

A NEW era in public illumination is dawning. The epoch of darkness relieved only by the few straggling rays of the watchman's lantern, or the occasional lamp suspended from the mansions of the wealthy, ended definitely with the advent of illuminating gas. Public lighting as a public utility has thus existed for the past century; but it is only within the past decade that public lighting has been recognized as a proper means of expressing public taste, enterprise, and civic spirit. To so light the street as to render it not only serviceable, but secure from the depredations of the lawless, was one of the great achievements of modern civilization, comparable to the suppression of piracy on the high seas; in fact, it was a much more important step, for in point of numbers the opportunities for crime in unlighted streets are far in excess of those afforded by the ocean.

But the modern city is much more than a mere collection of human habitations; it is a personality,—a composite of the characters of its citizens. The citizen expresses himself in his store, his office, his bank, his club, his residence: the collective expression of these various interests and tastes is found in the public places—the parks, the streets, and public lighting. It is to the credit of the American citizen that he never begrudges the money honestly expended in the production of architectural excellence in buildings, generosity in the extension and beautification of parks, and thoroughfares in all public works. Even the lamentable misuse of the public funds which frequently accompanies public enterprise, has never quenched the pride of the American citizen in that which represents

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the government of which he is a part. The past year or two has seen a remarkable awakening to the fact that the illumination of a city is one of the most effective and powerful means of expressing the confidence and pride which the American citizen takes in his own town. Such illumination serves a double purpose; it is a thing of beauty and a constant delight in itself, and it may be made a most striking means of displaying the important features of the municipal commonwealth.

The whole matter of public lighting is one which demands careful and continuous study on the part of engineers who should be particularly charged with these matters. We, therefore, take occasion to again call to the attention of the municipalities the necessity of including an illuminating engineer among its regular employes.

The New Electrical Utensils

By Agnes Spaulding

ELECTRICITY as a means of heating and cooking is steadily gaining in popularity as it becomes better known. Much of this season's output of household utensils, however, consists of improvements on the old models, although there are some entirely new devices on the market.

The electric stove is merely a flat disc of cast iron and looks like a misplaced stove lid. In order to economize heat units, saucepans are made to lock securely on the surface. They are made of copper and are flat bottomed to insure the maximum of conductivity. The square seams, so difficult to keep clean, the manufacturer has avoided by rounding the inner surfaces.

The electric broiler seems to do and do well all that is claimed for it. It is merely a slab of corrugated cast iron connected, like the stove, by a wall plug with a circuit. A broiler should always be provided with a hood connecting with the chimney, in order to obviate smoke and odors.

Really new are the electric frying kettles. They are practical especially for large households where much of this kind of cookery is done. All of the utensils are equipped with what are called "one-heat" and "three-heat" switches. The latter should be used to obtain maximum heat quickly, the former will maintain the desired temperature. A combination switch, while making the first cost of the utensil slightly greater, is really economical, reducing as it does the maintenance cost.

A lover of waffles declares that he has discovered a new dish in the electric waffle.

"Good?"

"Yes, but entirely different in flavor from the old kind."

It seems that the electric iron is deeper than the old pattern, requiring a bit more batter than the ordinary iron; the cooking is more even and the finished product is lighter, while not quite so crisp as the old-fashioned waffle.

Electric ovens do not heat entirely by radiation as yet, so real roasting cannot be accomplished, but they are perfectly satisfactory for all ordinary baking.

Popped corn becomes more available since it may be cooked on the parlor table. The electric popper is a rather deep saucepan mounted on small, rubber-tired wheels and covered with an oval wire screen to keep the popping kernels from flying out on the floor. The wheels provide easy shaking. The utensil is connected with an incandescent light socket and in a very few moments after connection the popper is hot enough to use.

Coast Municipal Lighting News

The Sacramento street committee, represented by Mr. Schacht, has reported on the report, estimates and specifications of Prof. Cory, expert on a municipal lighting plant. The report says in part:

"Sacramento has 550 street lights. Professor Cory's estimates are made on a basis of 600 lights, and the conclusion reached by him is that the city could by construction and operation of its own plant secure the lights at $6.70 per month. This estimate, however, is based on a price of $1.00 per barrel for fuel oil, while the fact is that the city is now paying $1.15 per barrel with but little prospect of paying a lower price at any time in the near future. This additional expense would be $1725 per year, or a little more than 23 cents per lamp per month. It also was shown with reasonable certainty that one lamp trimmer would be required in addition to those estimated as necessary in Professor Cory's report, and this would add about 21 cents per month to the cost of each lamp, making the total cost per lamp as much as $7.14 per month, as against $7.00, the rate now paid by the city. Professor Cory's report estimates the cost of installing a 600-lamp plant at $237,200. In addition to this it would be necessary in order to avoid purchase of incandescent lights for city hall, library, art gallery, etc., to install an incandescent system at an additional cost of probably $18,000. We cannot recommend that at this time the city shall incur an additional bonded indebtedness of over $250,000 unless it can be certain of reaping proportionate benefits."

Street lighting in Pasadena proved an expensive luxury during the month of December according to the report of Superintendent Glass, which was made public recently. There was a saving of $444 as against the amount the city had been paying the Edison Electric Company for the same service, but as a matter of fact there was a net loss of $931 to the city. Interest on the investment that the city has made, at the rate of 6 per cent per annum, would show a charge of $1375 per month, so that the city lost exactly the sum named.

A resolution of intention declaring that public necessity demands the holding of a special election to vote two sums of $50,000 for the improvement of the municipal electric lighting plant and a sewer system in East Pasadena, has been formally adopted by the Pasadena City Council.

Mayor Lane of Portland, Ore., asserts that the officials of the Mount Hood Company have assured him that they would be ready to furnish lights to the municipality by January 1, 1909, and that they want to put in a bid for the city lighting. The Portland Gas Company wishes to bid, as it pro-

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poses to install 3500 lamps on the West Side, and 4500 on the East Side, to see if the city will consider gas lighting.

In the very brief time in which City Engineer Taylor had to secure estimates, he reported that it will cost the city approximately $550,000 to equip and put into operation its own electric lighting plant. It will cost about $30 per lamp, it is estimated, to maintain the service. Mr. Taylor figured the depreciation at 5 per cent, but Chairman George B. Cellars, who was presiding, expressed the opinion that this item will be not less than 10 per cent.

A Safety Device

A New York man is about to patent an invention which he expects will make him rich and famous. By pressing an electric button a large sign appears in the kitchen indicator, saying, "You are discharged." In this way the mistress of a home can dismiss her cook and stay quietly locked in her bedroom until that lady has departed.—The Circle.

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Architect Mathews Sued

Are the plans for a country house the sole property of the man who pays an architect to draft them? This is the question which will be decided shortly by the Marin county court at the instigation of Frank D. Madison, a well-known attorney and clubman of San Francisco. The defendant in the case is Edgar Mathews, equally well known as an architect and clubman. The other defendants are Mr. and Mrs. de Courtieux of San Rafael and their contractor.

About two years ago Madison decided to build on the Coleman tract in San Rafael and he engaged Mathews to draw the plans for a house, which was to be unique and totally unlike any of its neighbors. Later Madison's brother-in-law decided to build near by, and the attorney was surprised to learn that the plans for his long cherished residence had been duplicated by Mathews for his relative. Madison protested and Mathews consented to draw up some new plans. Later the brother-in-law died and his proposed residence was never built.

When Madison's home was almost completed De Courtieux bought a lot two doors from him and sought and gained permission to inspect the unusual house of his neighbor. The result was the preparation by Mathews for De Courtieux of similar plans for a house on the lot which the new comer had just acquired. Through neighbors Madison's wife heard this and she at once informed her husband, who entered suit without delay to have the persons interested restrained from erecting such a house.

In the suit Madison maintains that much of the value of the home is due to its unique architecture, and in support of this assertion he has the testimony of two real estate dealers, G. D. Shearer and L. A. Lansell, who maintain that the striking features of the house greatly increase its material value. These witnesses assert that a similar structure near it would materially lessen its price in the real estate market..

Madison has also procured an affidavit signed by Architects Clinton Day, William Noyes, W. D. Bliss and Fred H. Meyer, charging that Mathews has been guilty of a breach of professional ethics in supplying the same plans to two residents of the same city.

According to the plans submitted to the court by Madison, the only difference in the two houses is in the size of a gable and a dormer window. Madison's house, which he now occupies, is a plastered cottage of an unusual English design.

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A Very Poor Policy

It has always been our opinion that one of the true functions of trades unions should be to promote and maintain a high standard of efficiency amongst their members. Labor union leaders generally claim that the unions do do this. Our experience teaches us that the practice of trades unions is to see that the efficiency of their members is reduced as much as possible and their remuneration increased regardless of circumstances.

In support of this we would point out that five years ago bricklayers in San Francisco were laying from 2000 to 3000 brick per day whilst today the day's work ranges from 750 to 1500.

During the month of February in this year the lathers' union passed a resolution forbidding a lather to put on more than 100 yards of metal lath per day under penalty of fifty dollars for every offense.

Are actions like these calculated to raise the efficiency of the workman? Can anyone defend such a policy as this, a policy which tends to destroy ambition, proficiency and all that goes to make life worth living? Let the members of the labor unions in San Francisco at once recognize that their true hope of advancement and prosperity lies in working with their employers and not against them.—The Citizen's Magazine.

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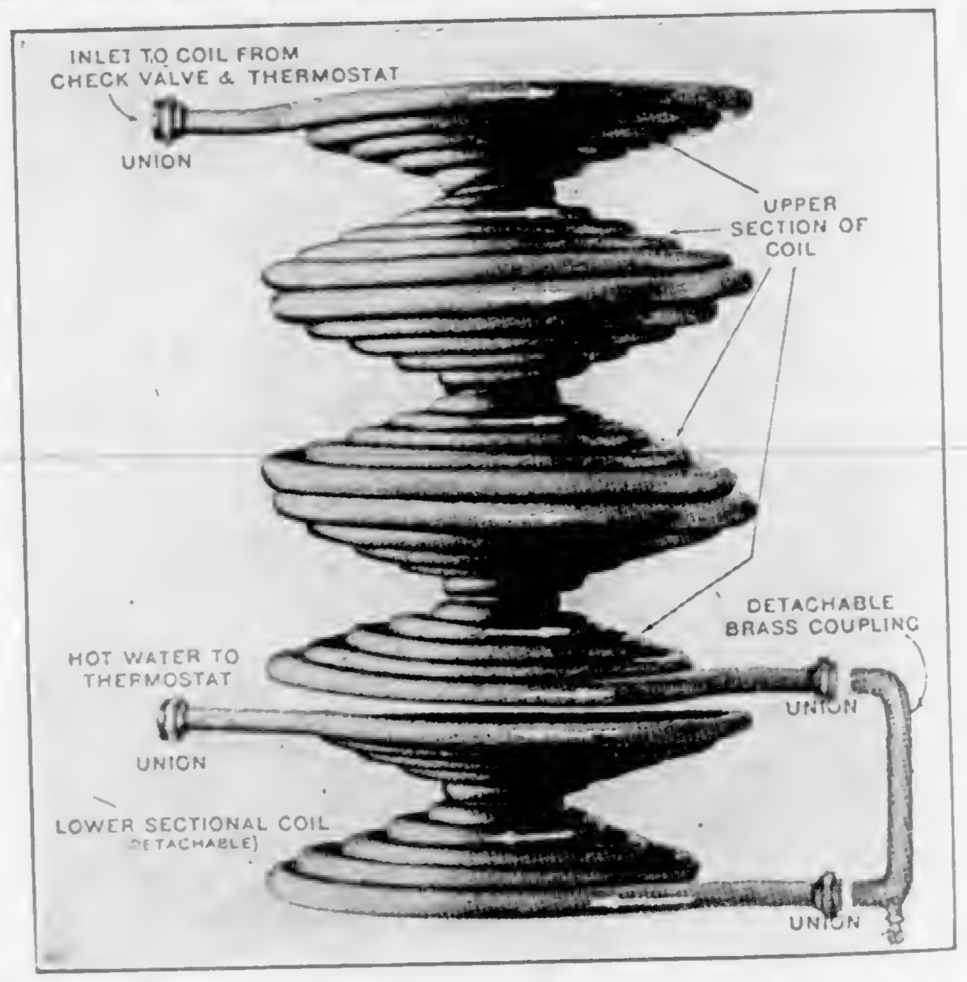

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Electric Welding

THE art of electric welding is comparatively old, so that it seems strange that it is not more frequently made use of in the shop. There are several systems of bringing metal to a sufficiently high temperature to weld it by means of electric currents, each of which has some advantages, making it more or less suitable for certain conditions. Yet these are not utilized as often as they should be.

The general opinion seems to be that for electric welding an expensive apparatus is required, and that electrical energy is an expensive agent for producing heat. Neither of these objections to the system is of much weight, for although, for certain classes of work, a more or less elaborate device seems best suited for the character of the work, the regularity of the joint and the rapidity of working more than offset the expense of the machine. Moreover, there are some methods of welding which require nothing more than two water-tight barrels, a carbon rod and a source of electric energy. The expense of the equipment is practically nothing.

Regarding the cost of heat supplied in this way it should be remembered that, while the price is high when measured in kilowatt-hours, heat is being developed only while the metal is being heated; there is no appreciable loss; no attention is required to keep a furnace at a suitable temperature for welding and heating, and probably the actual cost of the energy used in making a weld would be little, if any, more than that of the heat furnished in a coal forge, if the latter be charged with all the loss taking place when the forge is not in use.

But the electric current may be used for welding and repair work where the ordinary type of forge is useless. Broken and defective castings may be repaired quickly and easily, and thus work which would otherwise be condemned be saved. And the intense localized heat which may be produced by the electric current may often be utilized in other ways for doing work which would otherwise require tedious handwork or expensive machining. In a shop provided with apparatus which makes available a current of several hundred amperes at fifty to a hundred volts, it will be found that this energy can often be used for saving much time or expense. An easily controlled method of producing intense local heating is a most valuable addition to the shop equipment. For this purpose the electric current is more flexible and more widely applicable than any other form of energy.—Electrical Review.

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By the Way

Some Industrial Information Worth the While

New Elevator Company Reaches Out for Coast Business

The friends of Mr. H. C. Biggs, for many years with the Otis Elevator Company, will be interested in the announcement of his retirement from the Otis company to assume the management of the Western Elevator Company, incorporated within the last couple of months, with main offices in the Humboldt Bank building, San Francisco. The elevators turned out by this company are a California product, the factory being in Southern California. Eventually a large shop will be maintained in San Francisco, with possibly branches in Portland and Seattle. Mr. Biggs' thorough knowledge of the elevator business and his wide acquaintance with the architects and building trades should insure success for the new company.

Wherever the Western Elevator Company's machine has been installed it has given perfect satisfaction. Some of the buildings: Two in the Chamber of Commerce building, Pasadena; three in the Los Angeles warehouse, three in the Niles-Pease furniture house, Los Angeles; three in the Lankershim building, Los Angeles; one in the Acacia hotel, O. T. Johnson building, Catalina hotel, First National bank, Long Beach; Scripps' building, San Diego; Virginia hotel, Long Beach; Y. M. C. A. building, Los Angeles, and many others. Most of the above are electric machines.

The following letter is self-explanatory:

"Gentlemen: In answer to your request that we write you a letter regarding our experience with your elevators, we take pleasure in saying that both your hydraulic and electrical elevators, which you have installed in buildings under our charge, have been very satisfactory, and we have no hesitancy in accepting your proposals whenever your figures are the lowest. Your truly,

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WHY NOT SPECIFY AND USE THEM?
DIECKMANN HARDWOOD COMPANY
OFFICE, MERCHANTS' EXCHANGE MILL AND YARD, BEACH AND TAYLOR STS.
SAN FRANCISCO, CAL.

Successful Hardwood Industry

One industry of San Francisco which has quietly but steadily grown to be an enterprise of considerable importance, is the Dieckmann Hardwood Company, manufacturers of hardwood lumber, whose mills and yard though not very large compared with the great softwood mills in Oregon and Washington, are constantly busy converting ugly, crooked and gnarled logs into the most beautiful pieces of lumber and veneers.

Mr. J. H. Dieckmann, the president of the company, may be called the pioneer hardwood log merchant on this coast, as he has been shipping logs to and from San Francisco since the early 60's. With Mr. Dieckmann are associated his four sons, who share in interest the company bearing their name. Like its head, this company is also the pioneer of its line, as it was the first concern to start and operate a saw mill for cutting exclusively its own hardwood log importations.

The constantly increasing demand and consumption of the Jenisero and West Coast mahogany turned out by this firm bear witness to the excellent product of its manufactures and show that the trade appreciates the value of attractive figure as secured by proper cutting of superior logs.

The offices in the new Mechanics' Savings bank in San Francisco are finished in Jenisero wood.

Business Good for Plumbers

Edmund Grundy, a well-known San Francisco plumber, has no reason to complain of business since the fire two years ago. He has been a very busy man and has found it necessary to maintain a large force of experts at his shop, 3549 Seventeenth street. Mr. Grundy did the plumbing in the following buildings: French-American bank, Sutter and Trinity streets; Somps apartments at Twenty-second and Mission streets; Van Berger residence, Robins apartments, Gladstone apartments, Shemanski and Avalon apartments, Hotel Bruce at Eddy and Leavenworth streets, Hotel Leo at Post and Larkin streets, and the Postal Telegraph building, at Bush and Battery streets, now under construction.

Builds Reinforced Concrete Structures

H. L. Petersen, contractor with offices at 109 O'Farrell street, San Francisco, has found a good field in that city for reinforced concrete construction and several pretentious buildings of that material have been put up by him in the last few months. Petersen is recognized as an expert in concrete construction, as he has made a study of it with a view to giving his clients the best possible results for their money.

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All Kinds of Marble Work

The Joseph Musto Sons-Kenan Company have equipped their new mill on North Point street, San Francisco, with all modern machinery and are in a position, they say, to execute all kinds of marble work. The company is making a specialty of first-class work for banks and hotel interiors and since the fire they have installed marble in many of the prominent buildings in San Francisco, including the Italian-American Bank building, the Balboa building, the Spreckels annex, the Lent building, the Sing Chong and Sing Fat buildings, the Robins, Welch, Jennings, Pacific, Koenig and Gunst buildings.

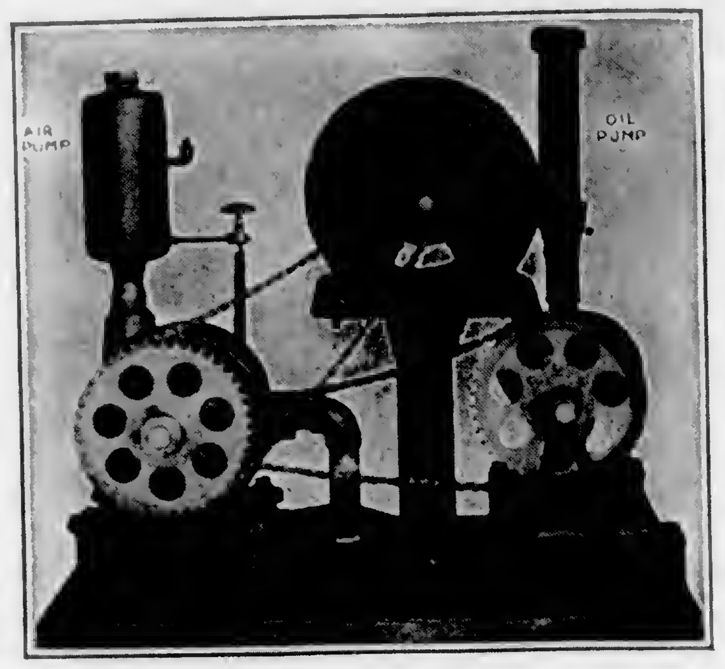
Humane Pat

An Irishman one time thought he would spare enough money for a chicken dinner. So he hied himself to the nearest restaurant and proceeded to order his dinner.

"Oi'll have chicken," said Pat to the waiter.

"Would you like it smothered in onions, sir?" asked the waiter.

At this, Pat, with a crash of his fist on the table, exclaimed, "No, be jabers! Give the poor divil a chanst. Wring his neck."—Ex.



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Successful Iron Works

No one firm has met with greater success in its business dealings with the building trade in San Francisco since the fire than the Pacific Structural Iron Works, F. J. W. Anderson and C. Larsen, proprietors. The works are located at 1021 and 1023 Bryant street and are well equipped with machinery for carrying on the big business which this company has been doing since the big fire. The management has taken pains to deliver the right kind of material on good time and at fair prices. These are points which the architect and owner are quick to appreciate and they explain in a large measure the secret of the Pacific Company's success.

The list of completed contracts is a long one and includes office buildings, hotels, apartment houses and commercial structures. Among the buildings designed by Architect T. Paterson Ross and supplied with steel or iron by the Pacific Company are the Musto and Rivers building at the corner of California and Dupont streets, the Baldwin apartments at the southwest corner of Polk and Post streets, the Gladstone apartments, a four-story building at the northeast corner of Polk and Eddy streets and a three-story office building on Kearny street and Hardie place.

Other contracts completed include the Hirsch building, the Captain Goodall building, the Hotel Arthur, Taylor building, Ross & Burgren; the Scott and Van Arsdale building on Mission street, between Third and Fourth streets, the Robbins building, at Ninth and Market streets, Ross & Burgren, and building at the corner of Pacific and Kearny streets, Hirch Bros. owners, Salfield and Kohlberg, architects; two near the northwest corner of Dupont and Sacramento streets, Sacramento and Drumm streets, four-story building on Eddy street, near Polk, building at Pine and Battery streets, and the Meyer building on Howard street.

Kittle Construction Company

The Kittle Construction Company with offices at 82 Second street, San Francisco, has met with considerable success in building construction, it being the aim of the management to follow a conservative policy and take only such contracts as it would be able to handle in a manner satisfactory to all concerned.

The contracts the company has taken have been among the best and include the Durbrow building of reinforced concrete at the corner of Commercial and Front streets, the Sheideman building, an eight-story, Class A structure at the corner of Sutter and Stockton streets; addition to the power-house of the City Electrical Company at Beach and Mason streets and the Donohoe building at Pine and Battery streets, designed by Architect T. Paterson Ross and Engineer A. W. Burgren, a cut of which appears in this issue.

Nice Order for Winslow Bros. Company

The Winslow Bros. Company have been awarded the contract to supply the ornamental iron work, grille work, etc., for the new Pacific Mutual Life Insurance building, to be erected on the northwest corner of Sixth and Olive streets, Los Angeles. This contract amounts to $38,855. Parkinson & Bergstrom are the architects.

PHOTOGRAPH OF WINDOW MADE BY
Munich Art Glass Co.
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Phone, Franklin 1588 San Francisco

N. Clark & Son Busy

N. Clark & Son report business on the improve. The company has recently enlarged its brick factory in West Alameda and is in a position to fill promptly good-size orders for both pressed brick and terra cotta. This firm has done considerable work for Architect T. Paterson Ross, the most noteworthy of its recently completed contracts being the Clunie building. The handsome pressed brick and architectural terra cotta of this imposing structure was turned out at the Clark factory, also the cream-colored pressed brick on the Sing Chong building at California and Dupont streets, San Francisco, and the pressed brick and terra cotta to be placed on the Donohue building now under construction at Pine and Battery streets.

The enamel glazed terra cotta on the building designed by Architect Fred H. Meyer for the Holmes Investment Company on Post, near Kearny street, was furnished by N. Clark & Son, as will be the glazed terra cotta on Frank Maskey's building on Kearny street, near Market, designed by Architects Havens & Toepke.

Hydrex Waterproofing for Palace Hotel

The Boyle-Luey Company are very much gratified over the decision of Trowbridge & Livingstone, architects for the Palace hotel, who have specified Hydrex felt and compound to waterproof the curbs, sidewalks, foundations for engine rooms and all roofs of the new Palace hotel, Mahoney Bros., contractors.

The roof is to receive 5-ply of Hydrex felt and compound and the foundations will receive the same treatment. Three-ply of felt will be carried over the sidewalks to prevent water seeping into the basement. This is considered one of the largest waterproofing pieces of work that has been accomplished in San Francisco.

Larsen Bros., Brick Contractors

Larsen Bros., brick contractors, report business a little quiet just now, although it has been exceptionally good with them since the fire. Many of the prominent brick buildings in San Francisco were erected by this firm, including the Zellerbach, Clunie, Sing Fat and Hotel Robins, all designed by Architect T. Paterson Ross and Engineer A. W. Burgren. One member of the firm of Larsen Bros. now has under construction a substantial apartment house and plans are being prepared for a large building to be erected shortly by one of the other brothers.

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Kawneer Glass Setting

The new flower stand recently erected in the Ferry building, San Francisco, is an example of the excellent appearance of the Kawneer window bar which has been used to good effect here. The Kawneer bar is an up-to-date ventilating window bar and is being extensively used in the best buildings in San Francisco. The difference between the Kawneer bar and the ordinary brown bar is noticeable in the Ferry building where both bars may be seen, the Kawneer, as already stated, at the flower stand, and the ordinary bar in the candy store near by.

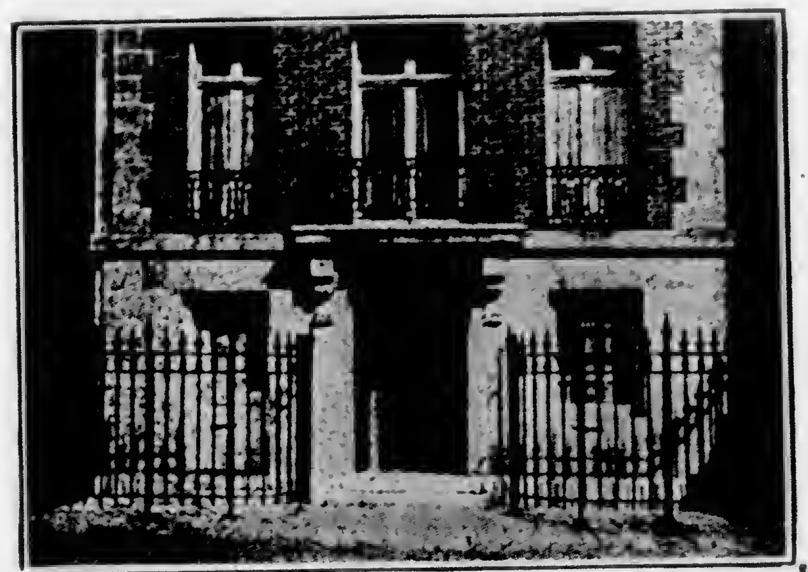
Among the many buildings equipped with the Kawneer bar are the Pacific building (entrance), Sing Fat building, California and Dupont streets; Russ building, Montgomery street; Kragens building, Market street; Gunst building, Market and Mason streets and others.

This window bar is also specified for the Y. M. C. A. building, the Whitney, Pabst, Rothschild, Justinian Caire, Byron Mauzy, Taft & Pennoyer buildings, and many others.

The offices of the Kawneer Manufacturing Company are in the Monadnock building, where all information can be obtained. Telephone, Kearny 3308.

Notable Addition to Technical Force

Engineers and contractors of the Pacific Coast will doubtless be interested to know that Mr. William A. Stock of Chicago has located in San Francisco permanently, having taken offices in the Russ building. Mr. Stock comes from one of the best known mechanical firms of the East, where he held a responsible position for a number of years. Their loss, however, is San Francisco's gain, as Mr. Stock is a man of great technical ability and is quite certain to give entire satisfaction to anyone requiring his services. He has come to form a partnership with Mr. A. L. Slee in the Russ building, and together they will take care of anything in the line of mechanical and electrical draughting. They are both experts at the draughting business and anticipate growing with the city in whose brilliant future they have unlimited faith.



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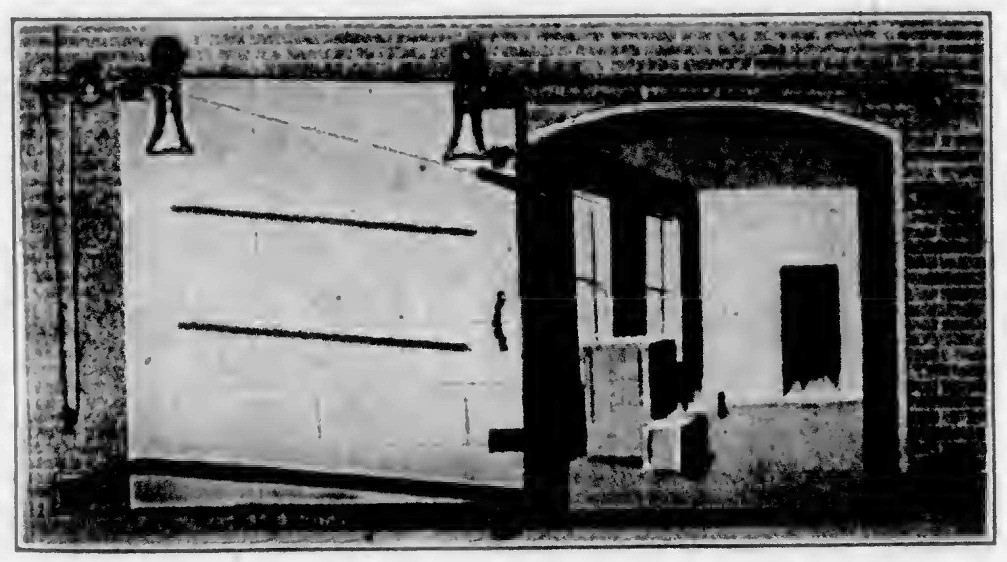

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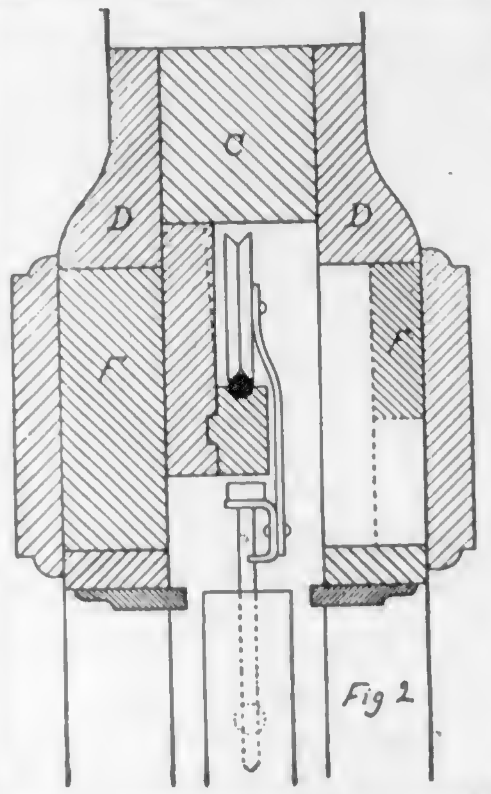

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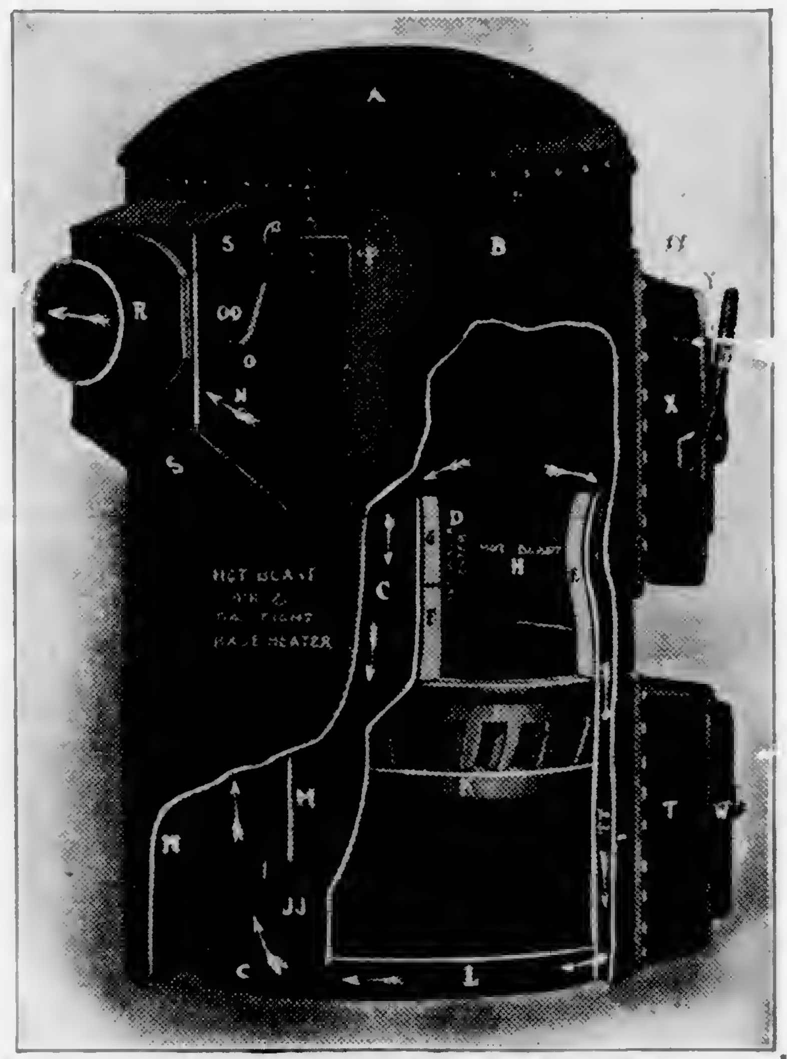

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The Sing Chong Bazaar

Truly the gateway to the Orient of the Golden Gate is the Sing Chong bazaar at California and Dupont streets. San Francisco's Chinatown, known the world over, holds no mart where tapestries and silks from the remotest corners of Asia, ebony and ivory carvings, teakwood furniture and hammered brass vases from the Far East vie in greater splendor and variety.

This bazaar is one of the sights of San Francisco. To the tourist from the East it is an introduction and an invitation to Chinatown. To the curiosity seeker from the city or elsewhere it is a revelation and delight. Situated at the beginning of Dupont street, the main thoroughfare of the Oriental quarter, it is always the first place visited. By reason of its unique showing and distinctiveness it usually is also the last remembered.

Five stories high, surmounted by a typical Chinese tower, which at night is illuminated with studdings of electric lights, commodious in its interior as any American department store, the Sing Chong bazaar is a startling but pleasing combination of flamboyant, Far Eastern gaudiness of color and clear cut Yankee enterprise and up to dateness. Chinese clerks. speaking precise English, attend customers with Oriental politeness.

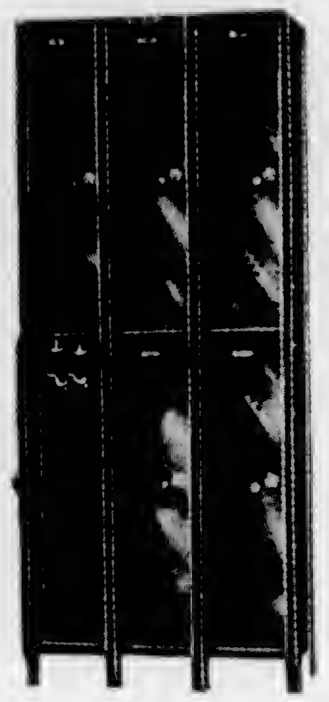
In all important trading centers of Japan and China are posted expert buyers for this bazaar. The Sing Chong Company has a factory of its own in Canton.

The Sing Chong bazaar is a success because well managed. The president of the company is a multimillionaire importing and exporting merchant prince of Canton, China, and the direct management in San Francisco is in the hands of the importer's son, Loo Chuck Wan, and Look Tin Eli, a prominent native Californian, who has a wide record of business success. He is a director in the Canton bank and formerly was a wholesale grocer.

The variety of goods to be had at the bazaar is large, a stock of $200,000 being carried. Among many others these are the principal lines of goods handled: Bronzes, porcelains, ivory, ebony, furniture, jewelry, screens, silk embroideries, kimonos, cloisonnes, satsumas, handkerchiefs, shawls, gowns, beads, bed spreads and silken underwear.

Gets Heating Contract

The Machinery and Electrical Company will install the heating and ventilating plant in the new grammar school at Pomona, Cal.



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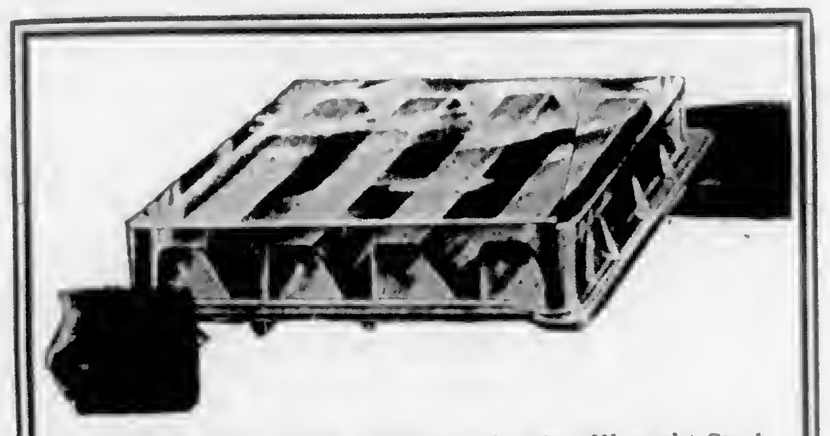

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Moves to Larger Quarters

The Frauneder Ornamental Iron and Wire Works have moved from Franklin street, Oakland, to their new factory at 860, 862, 864 Webster street in the same city. This company has lately taken the contract for the entire store front ornamental iron fixtures for the Taft and Pennoyer building. Mr. Frauneder also reports having taken a contract for supplying all the wire work for one of the big government buildings at Angel Island.

A Willkomm Moves

A. Willkomm, Pacific Coast representative of Toch Bros., New York, and well known throughout the Coast as a dealer in various building supplies, has recently returned from an extended Eastern trip, much improved in health and enthusiastic over the bright prospects for the future of San Francisco. Mr. Willkomm has moved from 779 Market street to 151 Tehama street, San Francisco, where he has a pleasant suite of offices.

Portland Architects at Banquet

The Portland Architectural Club held its annual meeting and banquet last night at the Hotel Heyser, corner of East Third and East Burnside streets, Portland. At the business meeting the following officers were elected: President, Joseph Jacobberger; vice-president, Edgar M. Lazarus; treasurer, I. W. Wilson; secretary, Richard J. Grace. The time of the regular meetings was changed from the first Monday to the first Tuesday of every month. The new officers were instructed to take steps regarding affiliation with the National organization. It was resolved to give another, and if possible, better exhibition this year and to interest all architects on the Coast in the affair. Seven new members were taken in at this meeting, making a total of 51. At the banquet following the business meeting Francis J. Berndt acted as toastmaster. Talks were made as follows: "Traveling Scholarships," E. F. Lawrence; "Organization," Ernest Kroner; "Beauties and Opportunities of Portland," H. B. King, of The Architect and Engineer. Toasts were responded to by various members. Among those present were: Joseph Jacobberger, Edgar Lazarus, F. J. Berndt, E. Kroner, J. G. Wilson, H. E. Raymond, E. F. Lawrence, George Rae, Otto Kleeman, E. W. Leick, J. A. Graef, A. H. Cedarberg, R. J. Grace, E. T. Root, J. H. Kable, F. T. Webber, E. E. Gilmer, G. F. Dunham, C. H. Kable, I. E. Frary, W. F. Hathaway, F. S. Allyn, J. M. Tanner, E. Timmes, S. H. Thomas, W. C. Cadwell, H. B. King.

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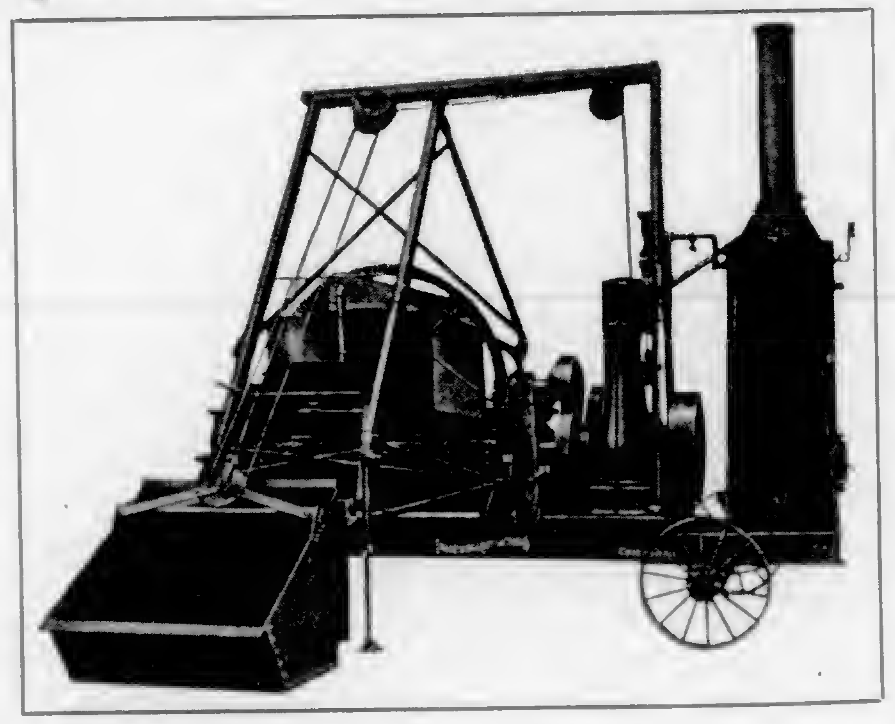

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Big Steel Federation

The iron and steel manufacturers of California, Oregon, Washington and British Columbia have organized the Pacific metal trades league.

In point of numbers and resources the league is easily the strongest employers' association on the Pacific Coast. It will rank as one of the wealthiest organizations in the country. Millions of dollars, involving investments perhaps greater than in any other line of industry, are represented in the big manufacturing plants of the members, which include the various metal trades and founders' association from Los Angeles to Vancouver and Victoria. In its united strength the league is purposed to be to the metal trades' employers of the coast what the American Federation of Labor is to the different labor unions of the country.

The four associations represented at the recent convention in Portland were the California Metal Trades Association of San Francisco and Oakland, the United Metal Trades Association of Oregon, Washington and British Columbia, the Employers' and Founders' Association of Los Angeles and the Pacific Foundrymen's Association of Seattle.

Among the big firms joining the federation are the Union Iron Works, Risdon Iron Works, Fulton Iron Works, Vulcan Iron Works, United Engineering Works and eighty other iron and steel firms in San Francisco; the Willamette Iron and Steel Works, Phoenix Iron Works, Smith & Watson, Pacific Iron Works, Oregon Brass Works and Columbia Steel Company of Portland: Moran Bros. Iron Works, Vulcan Iron Works, Eagle Iron Works, Heffernan

Yard & Hichborn

In connection with the fine work of Architect Charles F. Whittlesey, illustrated in the March number of the Architect and Engineer, credit should be given Messrs. Yard & Hichborn for their part in the construction of many of the important buildings shown. Besides the E. P. Bryan residence again shown in this number, Yard & Hichborn did all the interior woodwork in the Auditorium building and the Wentworth hotel, and had the general contracts on the residences of Mrs. Lucy Walker and W. S. Bartlett, and the Santa Fe eating house at Merced.

Goes to Butte, Mont.

John H. Kent has formed a partnership with George H. Shanley under the firm name of Kent & Shanley, architects, with offices in the Hennessy building, Butte, Montana. Mr. Kent was formerly located in Portland, Oregon.

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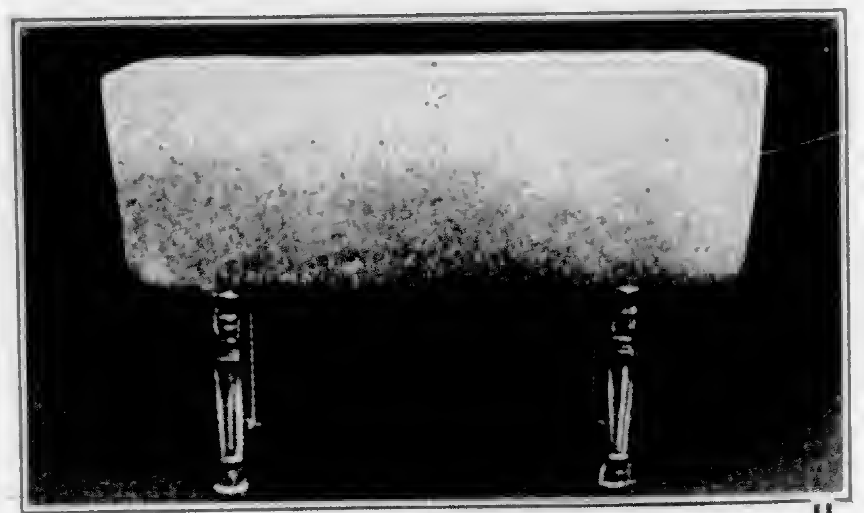

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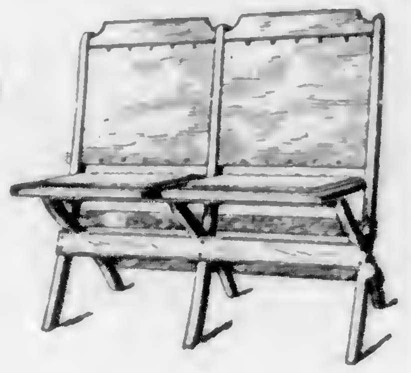

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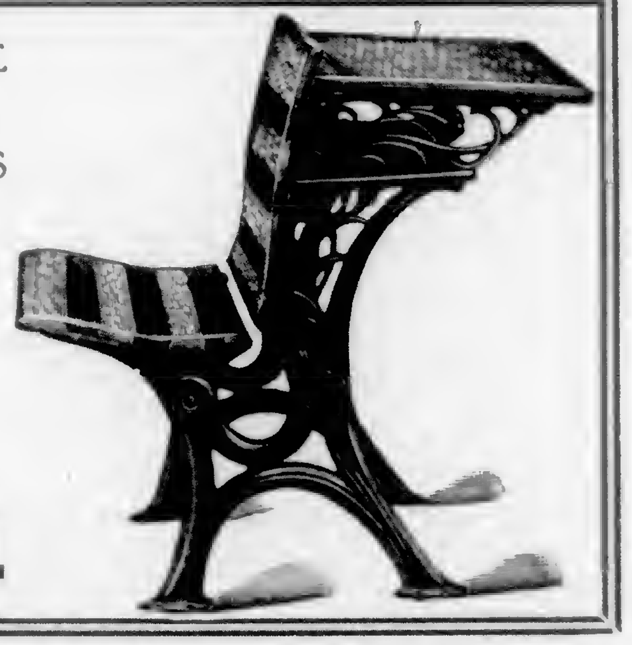

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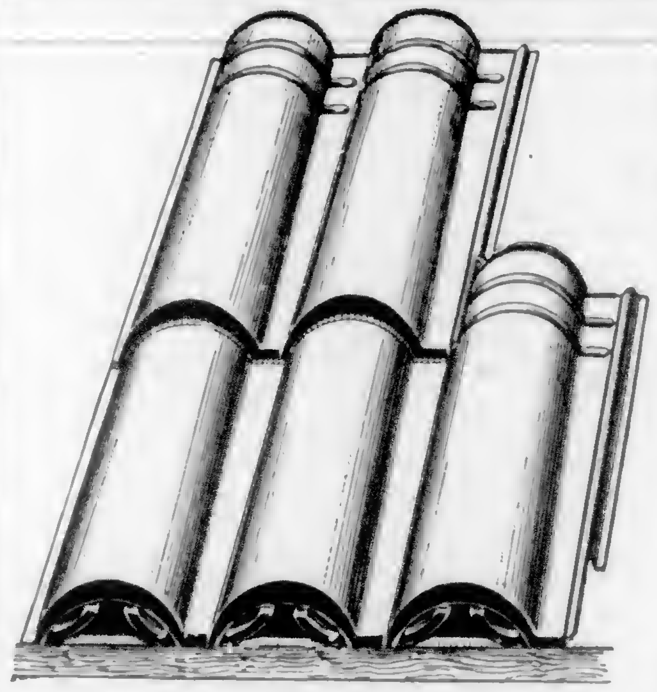

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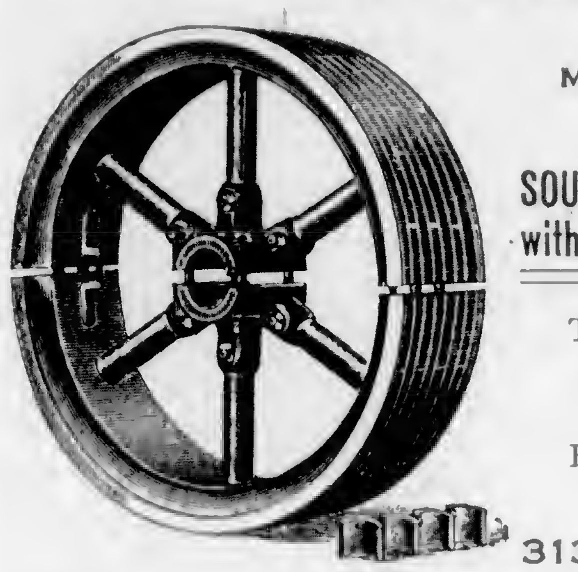

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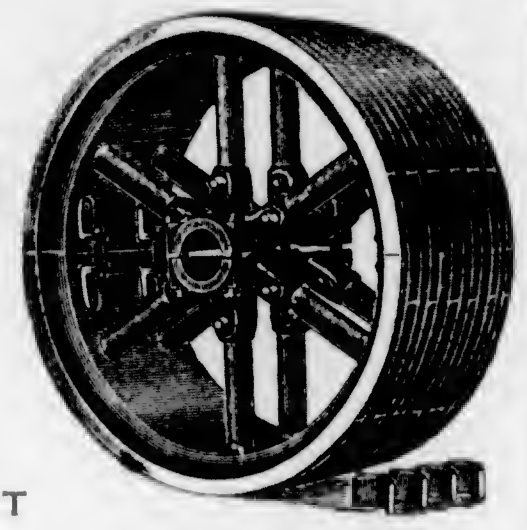

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Trade Journals Consolidate

The Industrial News of Oakland, edited by Mr. P. B. Preble, and the Industrial News of San Francisco, edited by Mr. L. A. Larsen, have been consolidated.

Both these publications are old-established Journals, and their consolidation makes a very strong combination, both editors being well and favorably known in their chosen field.

Built Ross and Burgren Churches

Fred Miller, carpenter and builder, had done considerable work for Architect Ross, whose work is shown in this number of the Architect and Engineer. Most important of Mr. Miller's jobs was the Jefferson hotel, a handsome four-story building, San Francisco. Miller also built the Gebhardt residence, the West Side Christian church and the First Christian church.

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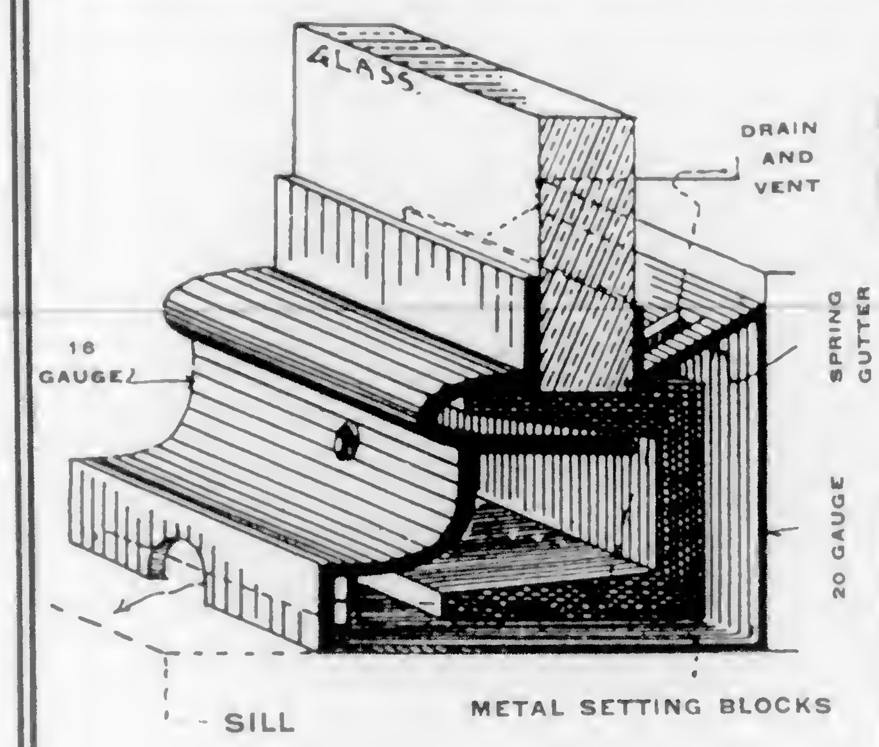

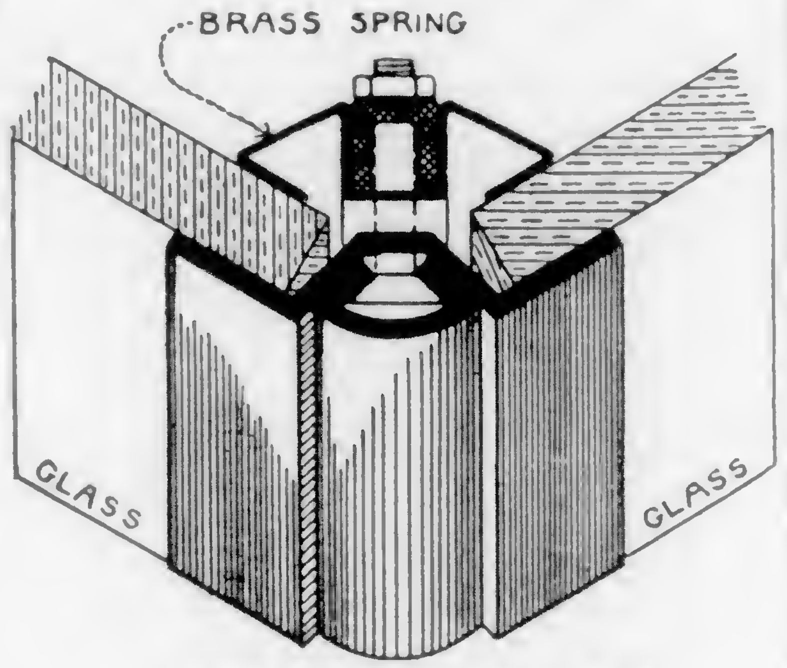

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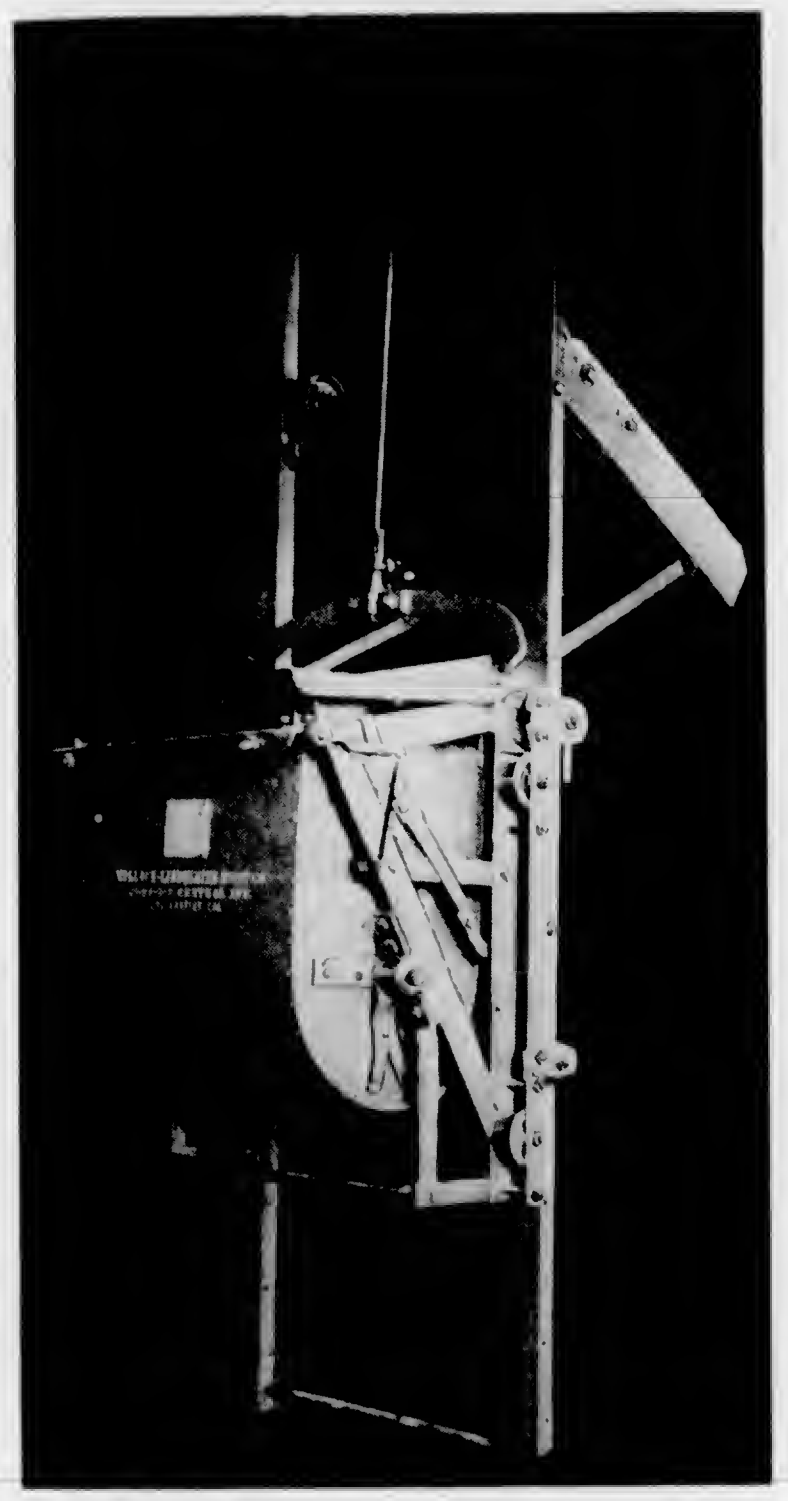

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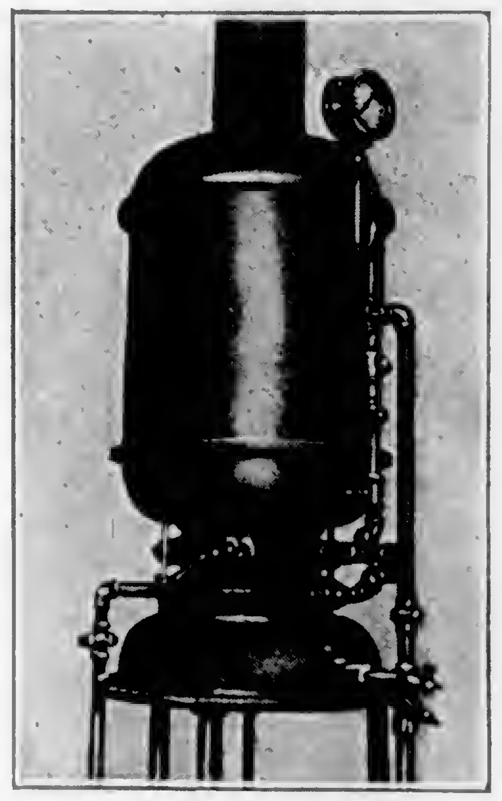

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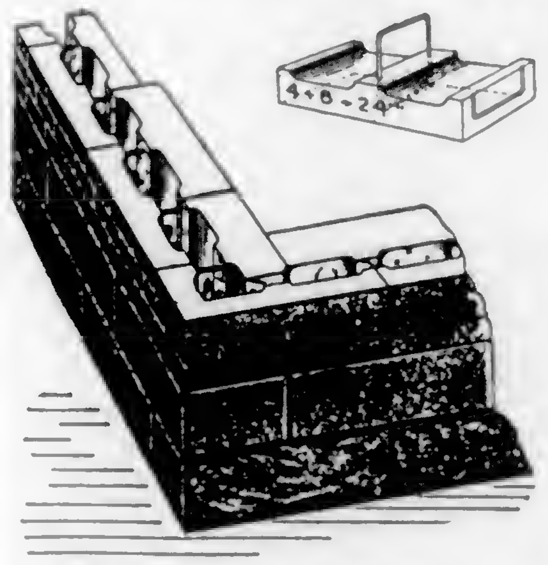

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The Hausmann sash carrier, as illustrated in this issue, is recognized by architects as the simplest and most practical device on the market today applicable to either old or new windows, permitting their cleaning from the interior of the room, thus eliminating all risk and the greater part of labor attached to the old-fashioned way of washing.

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Fixtures, comprising the Hausmann sash carrier, are supplied to the trade.

The following are a few of the office buildings recently equipped with this improvement: Alaska Commercial building, California and Sansome streets; Security building, Sansome and Halleck streets; Gunst building, Mission and Third streets; Whitney building, Geary street, Johann Schmidt building, Geary and Kearny streets; Sachs building, Geary street; Koshland building, California and Market streets; Silverberg building, O'Farrell and Mason streets; Justinian Caire building, Market street; all in San Francisco.

The office and show rooms of the Hausmann Sash Carrier Company are permanently located at 697 Monadnock building, San Francisco.

"Medusa" on the Bank of San Jose

The Building Material Company, 587-593 Monadnock building, is receiving many compliments for the handsome appearance of the new, five-story, reinforced concrete building of the Bank of San Jose, the exterior of which has been cemented with pure white "Medusa." The treatment consists of three parts white Monterey sand to one part of Medusa white Portland cement. The effect is really very striking and is a splendid example of what can be accomplished with the proper kind of cement in beautfying what would otherwise be a very ugly exterior. Henry A. Schulze is the architect of the Bank of San Jose building.

The Healy-Tibbitts Company

The Healy-Tibbitts Construction Company is one of the few big contracting concerns in San Francisco that has kept its full force busy during the present lull. This company has a most competent head who is aided by a staff of trained engineers, than whom there are no better on the coast. Besides general contracting the Healy-Tibbitts Company do an extensive business in pile-driving and fireproofing. Among the notable fireproofing contracts taken were the Levi Strauss building, the Murphy-Grant building and the James D. Phelan building. "Perfect organization," is this company's slogan, and the excellency of its workmanship fully justifies the use of the phrase.

Raecolith Sanitary Flooring

The Raecolith Company of Portland, has just completed two fine jobs of Raecolith sanitary flooring, one of thirty thousand square feet on the floor of the new wing to the State Insane Asylum at Salem, and the other in the Spencer apartment house on King street, Portland, where all the corridors, halls and stair treads are covered with Raecolith.

Contract Awarded for Sacramento Hotel

The fact that San Francisco contractors are able to figure reinforced concrete work at extremely low prices is evidenced by the bids submitted recently for the erection of the Sacramento hotel in Sacramento. Several bids under $300,000 for this building, which is to cover an area of 160 feet by 140 feet, and to be five stories in height with basement and with an ornamental roof garden, were submitted to the Sacramento Hotel Company.

The Ransome Concrete Company with offices in the Crocker building, San Francisco, was the successful bidder, being awarded the general contract for the entire building.

The Sacramento hotel, together with the property and complete furnishings, will represent, when complete, an investment of a half million dollars. The site is at the southeast corner of Tenth and K streets, with the 160-foot front on Tenth. This is directly in the line of the growth of the business section of the city, being about equi-distant from the Western Pacific depot site and the present Southern Pacific depot. Two blocks away is the terminus of the Northern Electric Railway, which is building up a constantly increasing passenger traffic in the Sacramento valley.

The structure will be five stories in height with basement, and will be surmounted by an attractive and ornamental roof garden covered with Spanish Mission tile, which will, undoubtedly, prove a very popular resort for evening gatherings during the hot summer months.

The building will be of reinforced concrete throughout, with concrete floors and stairways, and will be of thorough fireproof construction. The plans, which were drawn by Architects Sellon & Hemmings, call for one of the finest hostelries in the state, complete in all its appointments. A feature of the hotel will be the spacious main lobby and the mezzanine floor. The former will be sixty feet square and elaborately finished and furnished. On the mezzanine floor will be parlors and retiring rooms and a balcony overlooking the lobby. The main dining-room will seat 400 guests.

The three floors above the mezzanine are conveniently arranged for guest chambers, there being over 200 rooms, a large proportion of which are provided with private baths. The roof garden extends around three sides of the roof and with its massive natural-finish timber construction and Spanish Mission tile roof will give a very pleasing finish to the artistic facade of the hotel.

The general contract awarded to the Ransome Concrete Company covers all the concrete, masonry and structural work on the building, together with the fireproof partitions, the woodwork, marble, mosaic, slate, ceramic work, glazing, painting, plastering, sheet metal, ornamental iron, electric passenger and freight elevators, and also includes complete plumbing, electric wiring, steam heating and ventilating systems.

Work is to commence on the building during the month of May and the structure will be rushed to completion.

The members of the Board of Directors of the Sacramento Hotel Company, who have managed the enterprise, are the following: President, Alden Anderson; A. Bonnheim, President Weinstock, Lubin Company; M. R. Beard, ex-Mayor; Dr. W. Ellery Briggs, oculist; John Batcher, of the Shaw-Batcher Company; D. W. Carmichael, president of the Carmichael Company; M. Diggs, Thomson-Diggs Company; W. H. Devlin, of Devlin & Devlin, attorneys; F. W. Kiesel, cashier California National Bank; Arthur E. Miller, of White, Miller & McLaughlin, attorneys; Harry Thorpe, vice-president Weinstock Lubin Company. The building committee consists of Messrs. Diggs, Kiesel and Miller.

A New Gas Furnace

The "Sterling" Gas Furnace is the name of a comparatively new heater that has been placed on the market by the Gas Furnace Company. The headquarters of the old Builders' Exchange, at 226 Oak street, San Francisco, have been turned into a shop with a capacity of several furnaces a day. The furnace is an improvement over anything of the kind yet manufactured. Its makers claim it is less expensive to maintain than a wood or coal furnace. It heats well and, unlike the gas fireplace, does not absorb all the oxygen in a room. It is odorless and of course throws out neither dirt nor smoke. It would seem to fill a long-felt want for stores, offices, churches, theaters and residences.

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The Western Laundry Machinery Company is now permanently established in commodious quarters at 58 Fremont street, San Francisco. The same firm maintains branch offices in Los Angeles and Seattle, where a stock is carried sufficient to supply the demands of the trade in each territory. The Western Laundry Machinery Company, of which L. B. Howe is the president and treasurer, handles exclusively the goods of the American Laundry Machinery Company, successors to A. T. Hagen Co., Watkins Laundry Machinery Co., Barnes & Erb Company, Nelson & Kreuter Co., and the Wilson Laundry Machinery Company.

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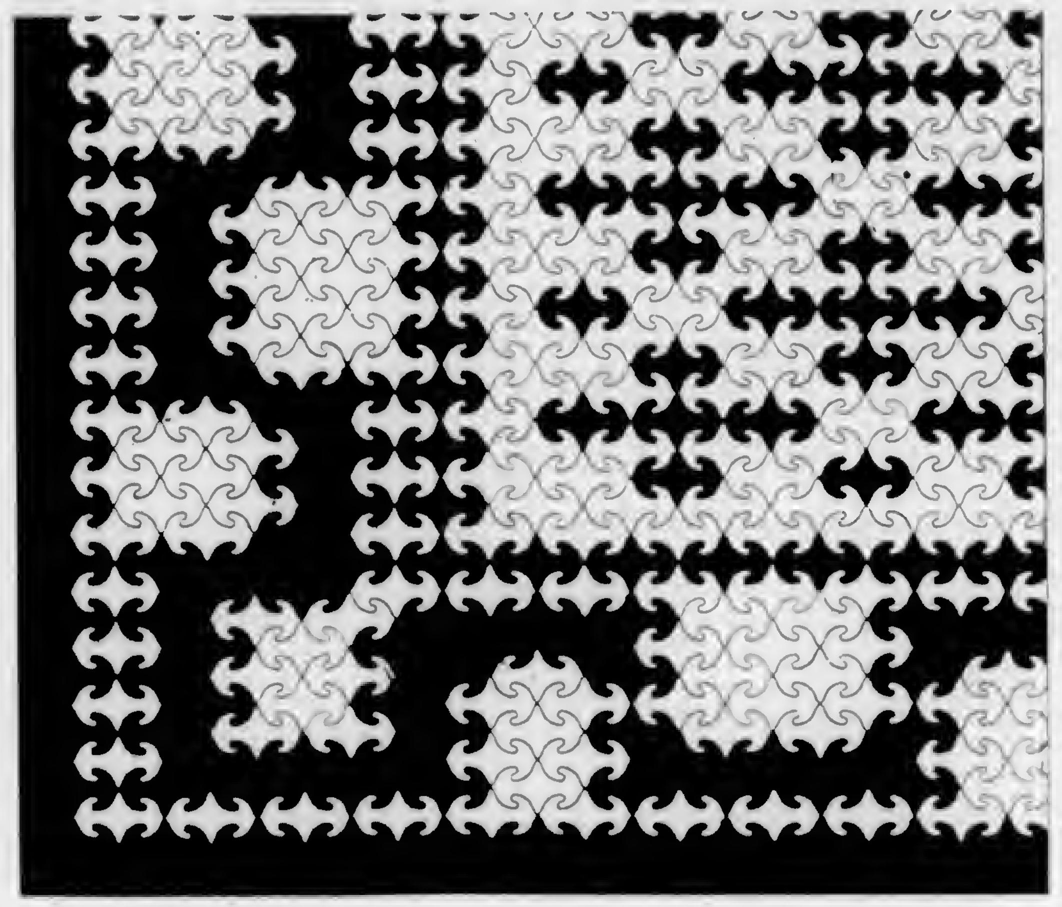

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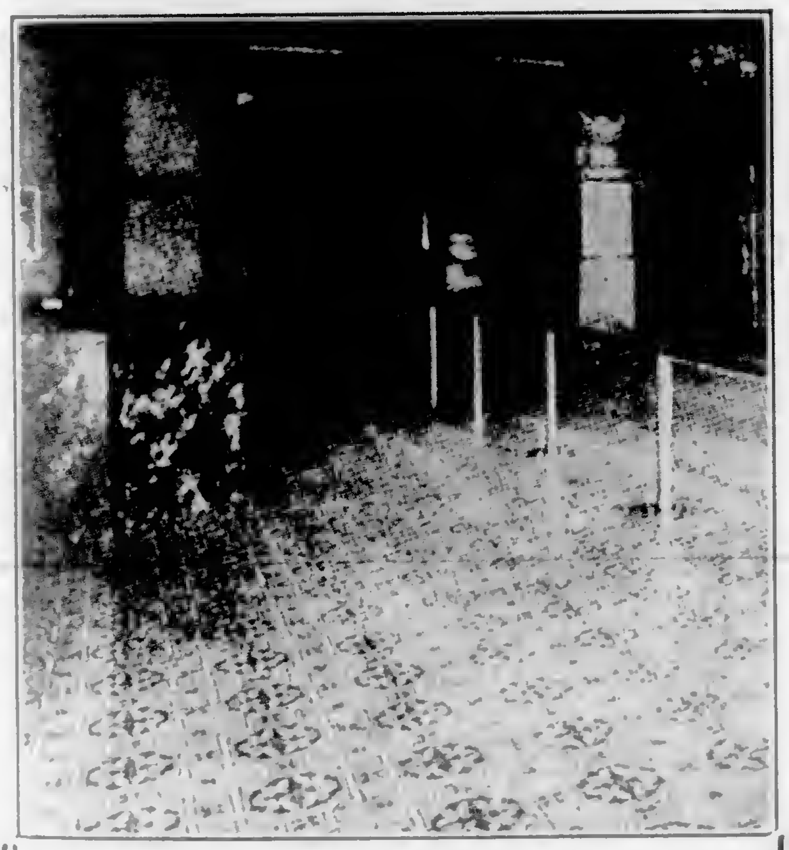

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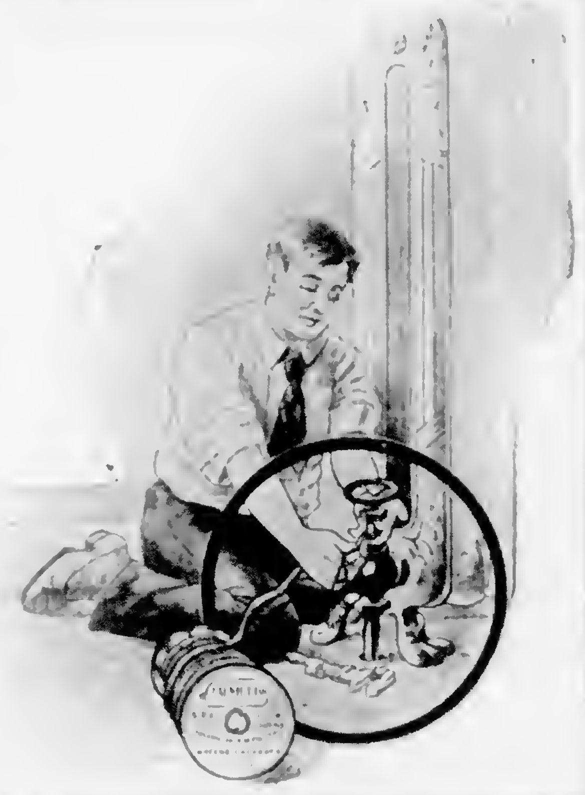

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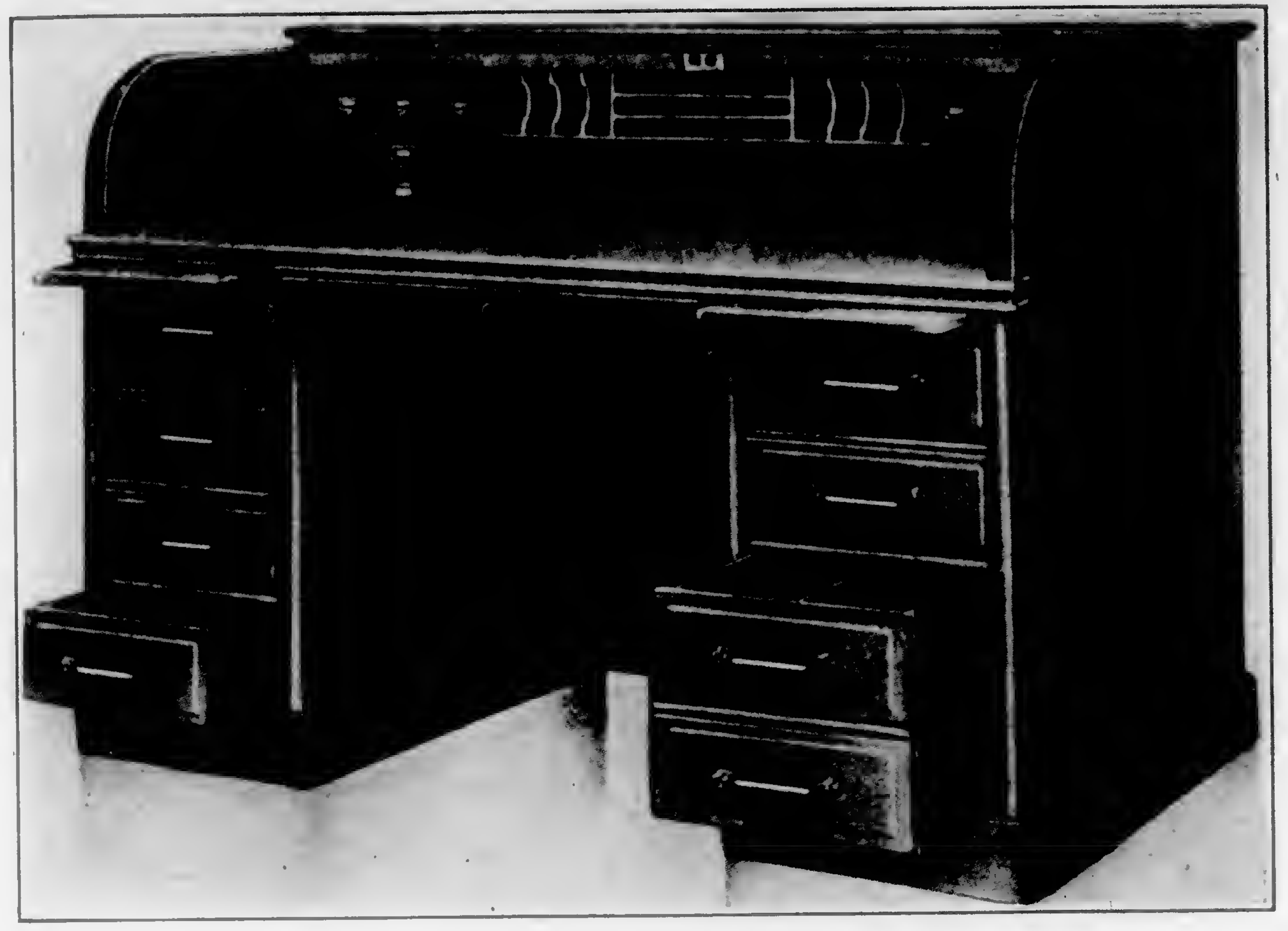

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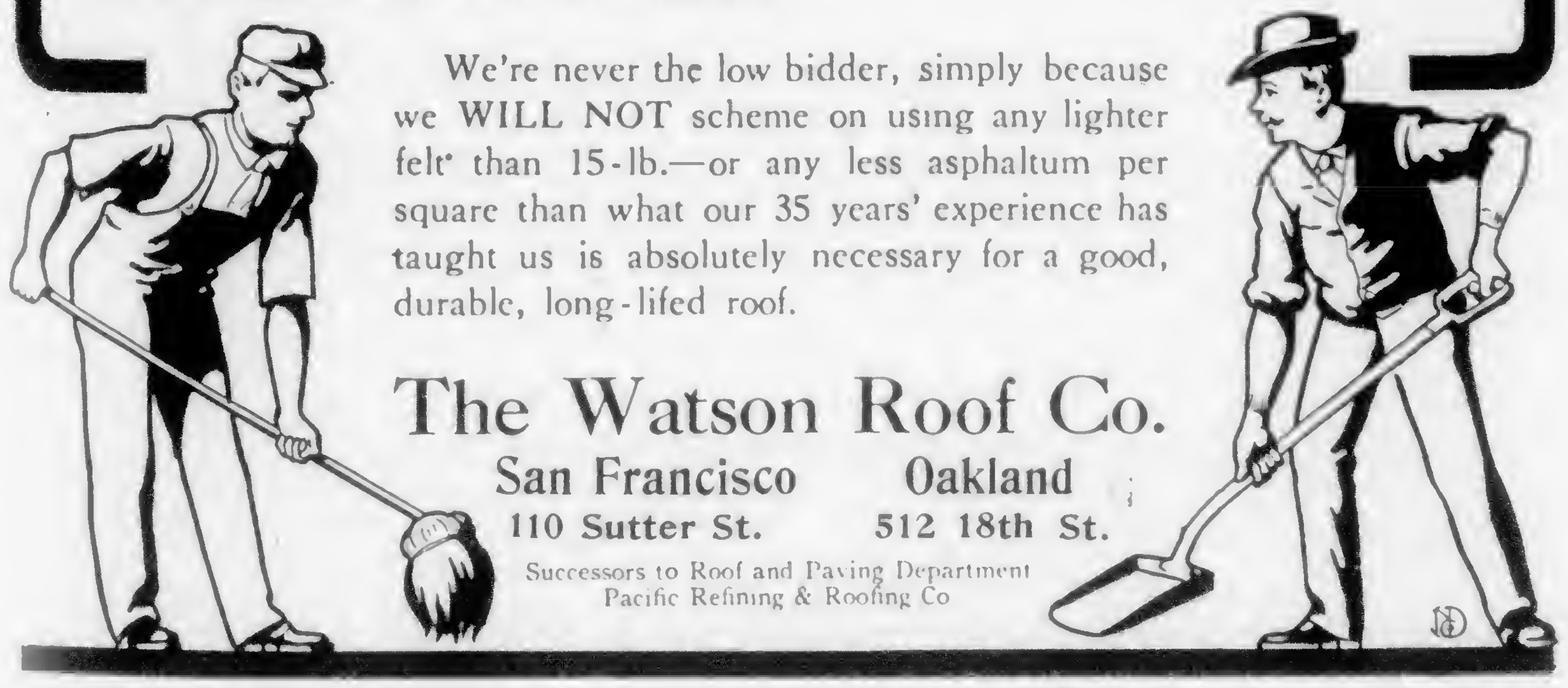

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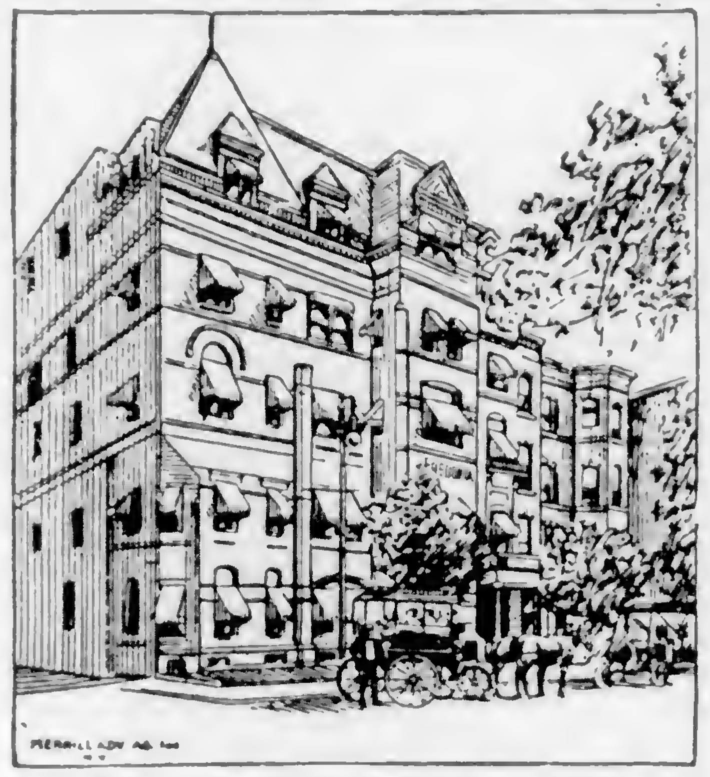

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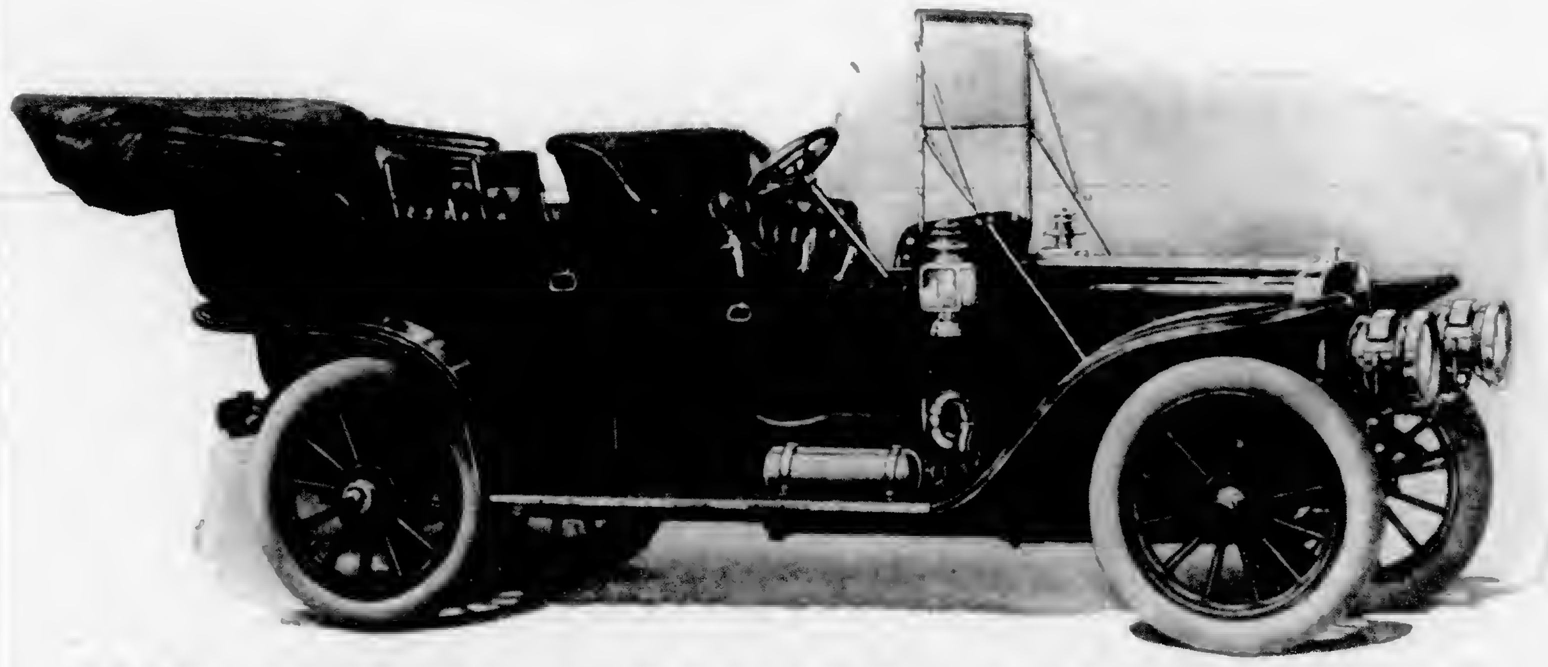

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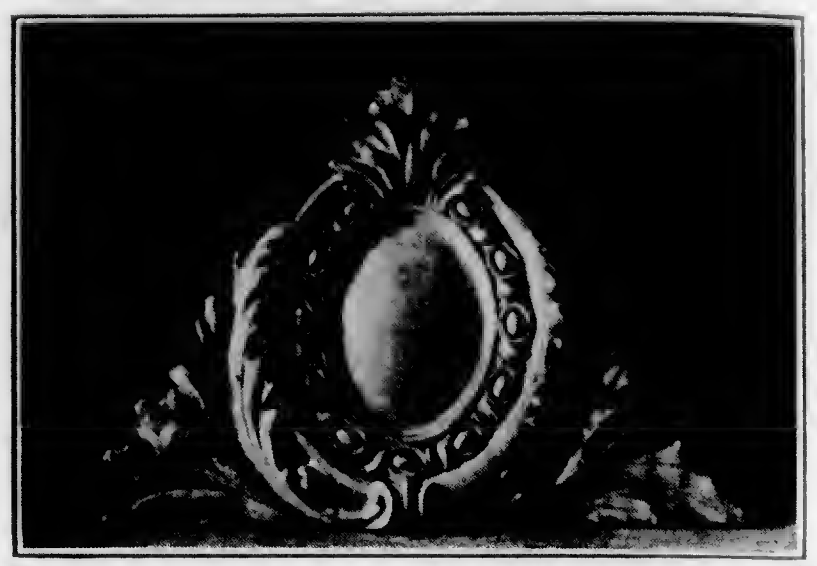

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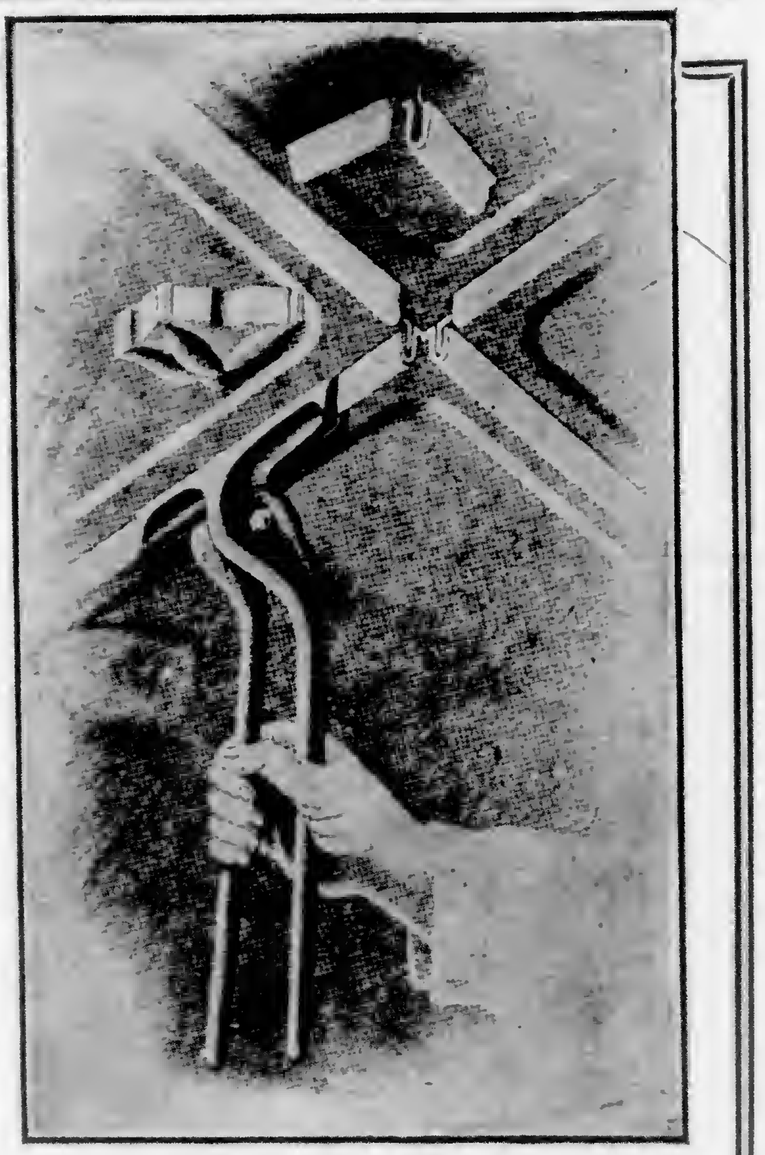

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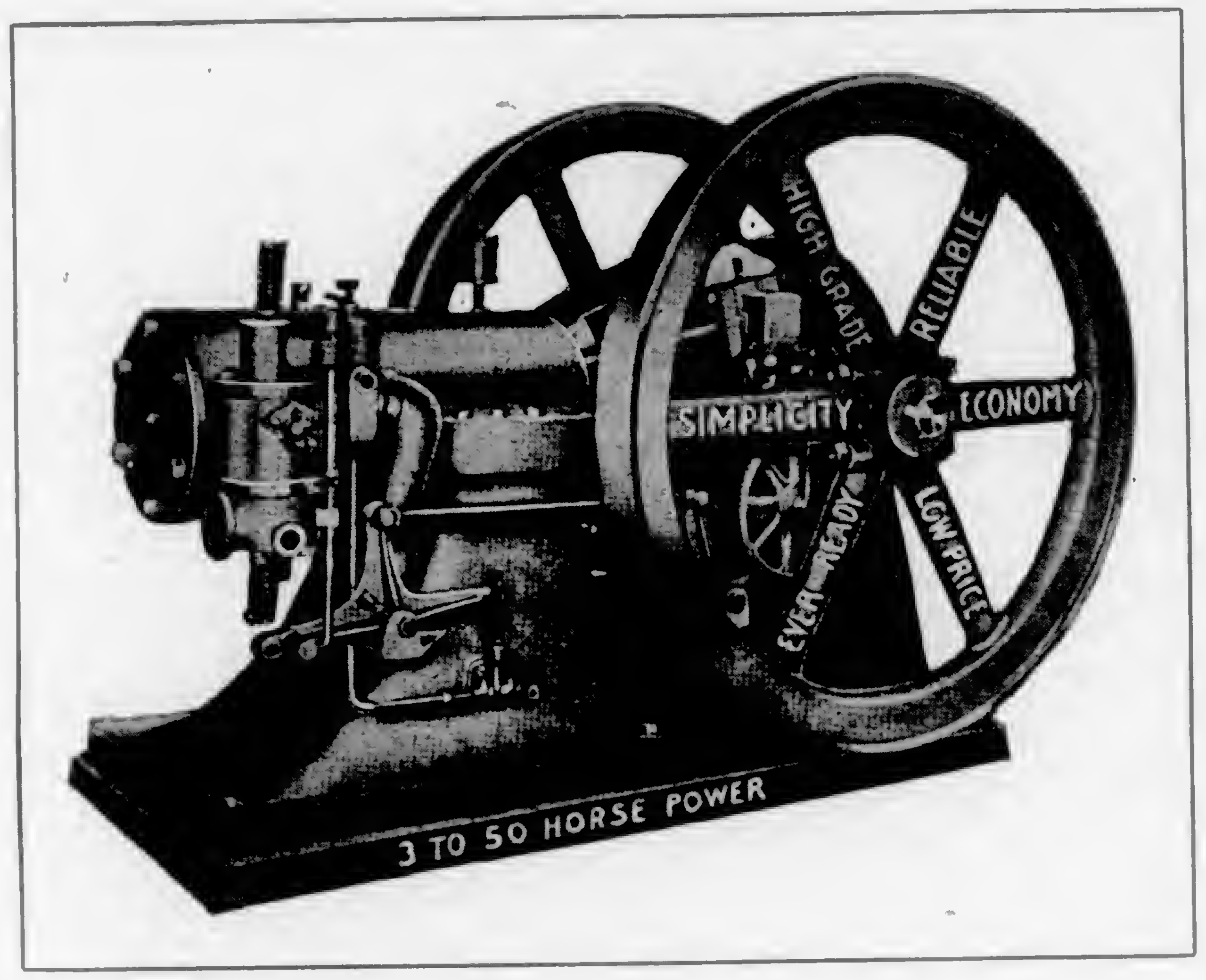

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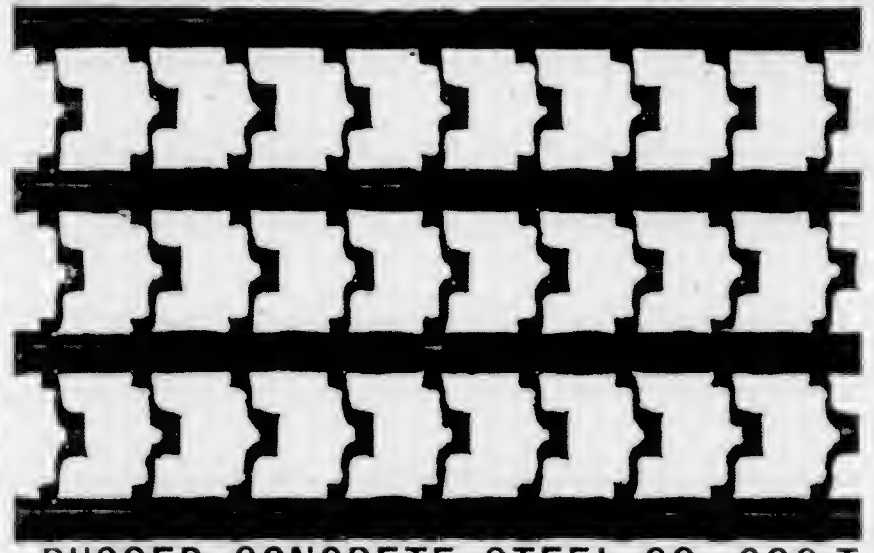

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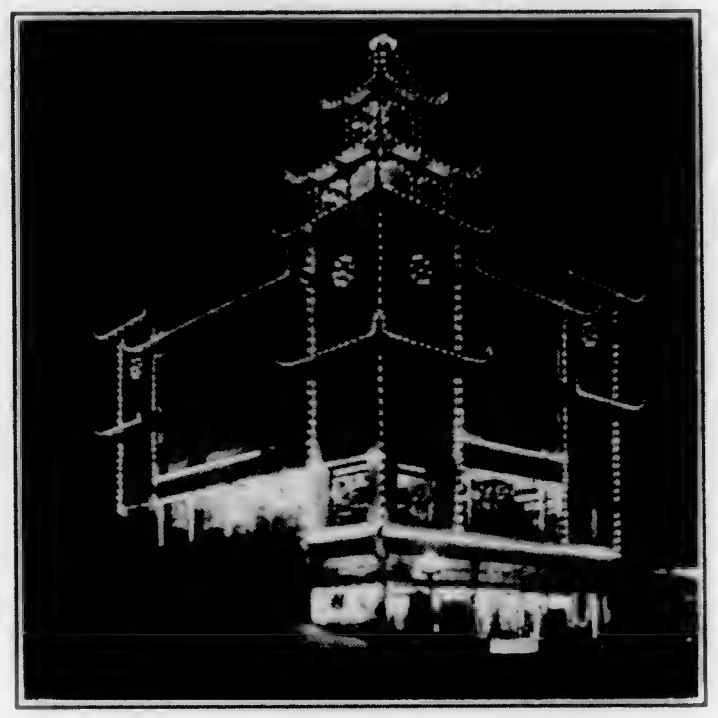

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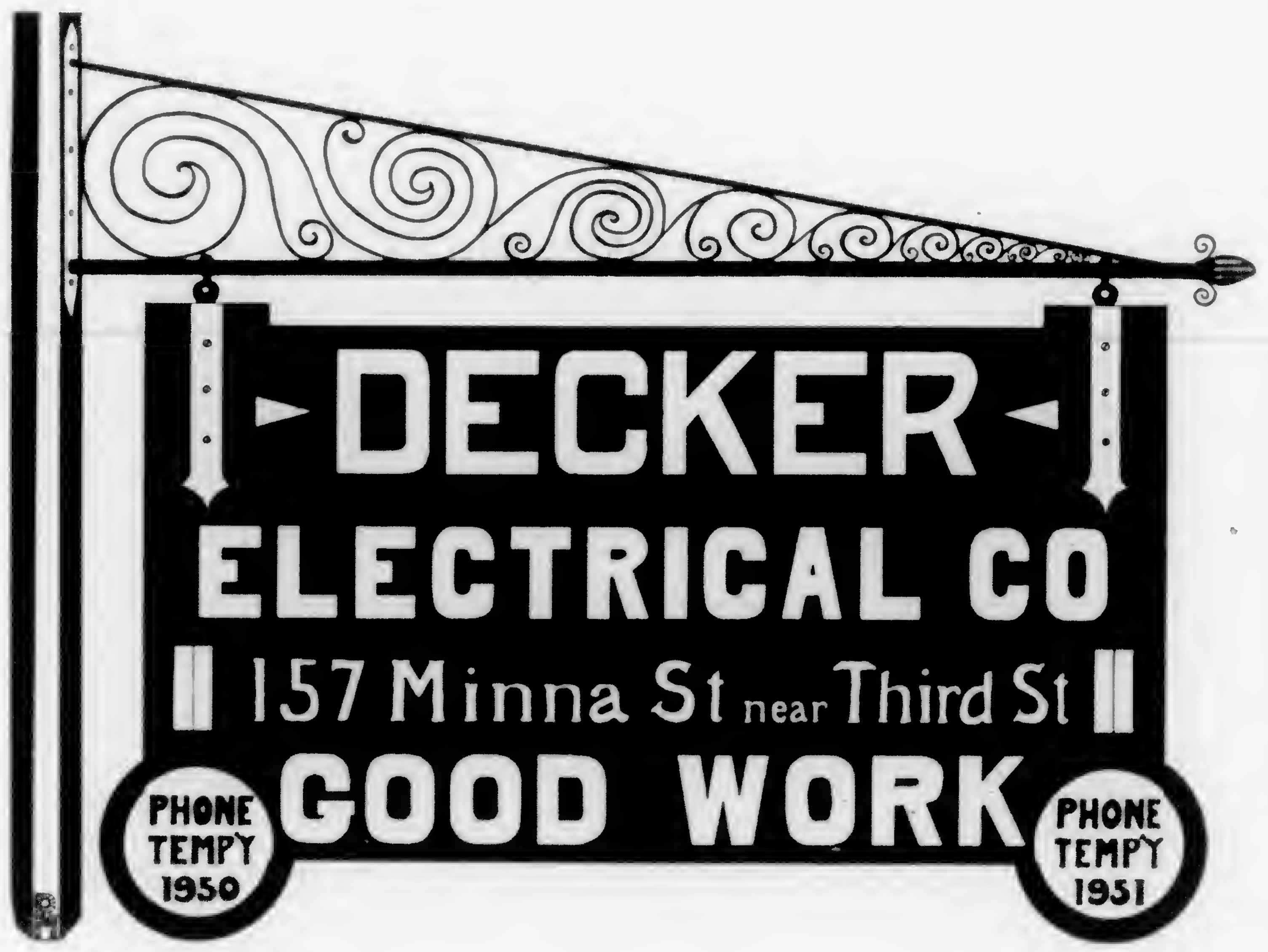

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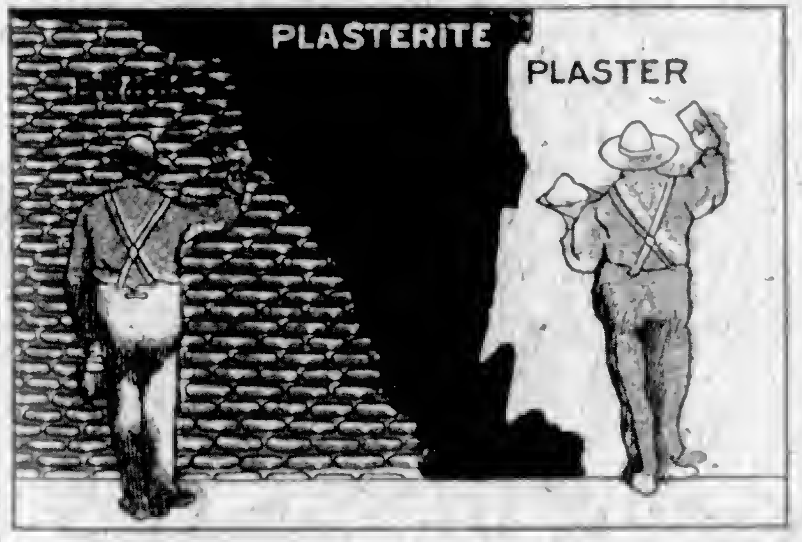

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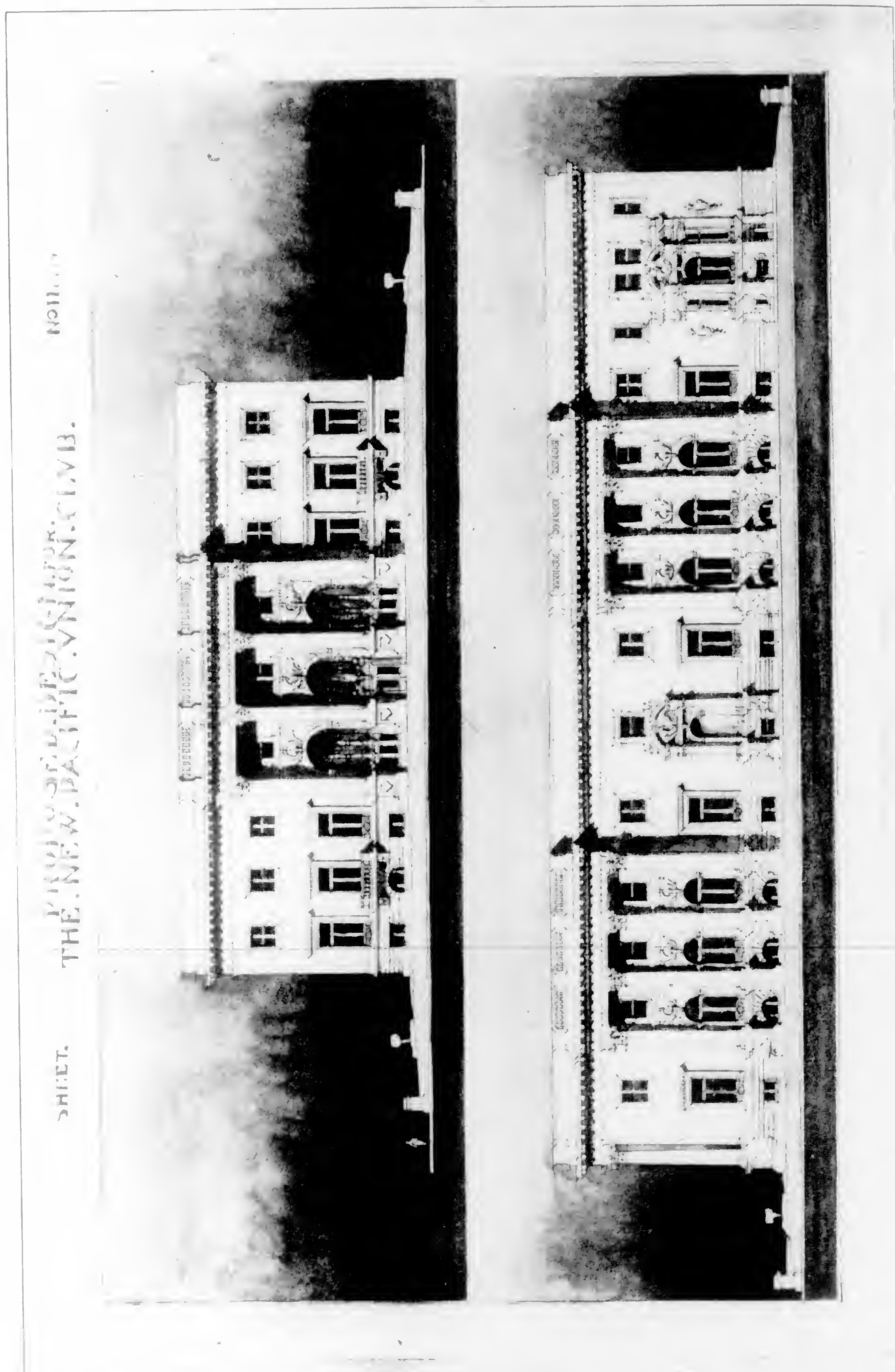

Frontispiece
The Architect and Engineer of California
1908

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THE recent competition conducted by the directors of the Pacific Union Club of San Francisco for the best design of a club house brought out some splendid specimens of architectural effort. Many of the leading architects in San Francisco were invited to compete, including William Curlett, Reid Brothers, Clinton Day, Louis P. Hobart, Trowbridge & Livingston of New York, Albert Pissis, MacDonald & Applegarth and Sutton & Weeks. The three last named were awarded first, second and third prizes, respectively, and Mr. Pissis' plans, with some modifications, will be the ones followed when the new building is erected. The club has a fine site at the corner of Mason and California streets.

The Pissis plan is a dignified and striking adaptation of the Italian Renaissance style of architecture, with the classic influence strongly asserted.

The plan of MacDonald & Applegarth is an expression of wealth and breadth and comfort. The style is French Renaissance.

The design of Sutton and Weeks shows a low and charmingly simple scheme, portraying an almost poetic interpretation of club life.

The following is a copy of the letter sent out by the club inviting competitive plans:

"The Board of Directors having decided to ask for competitive designs for the new club house to be erected on the lot on Mason and California streets, I beg to invite you to submit a design or designs, for the same.

"For your guidance the following information and conditions are given in order that all competitors may work upon the same lines in a general way.

"The cost of the building should not exceed $350,000.

"The site fronts 212½ feet on California and Sacramento streets and 275 feet on Mason street.

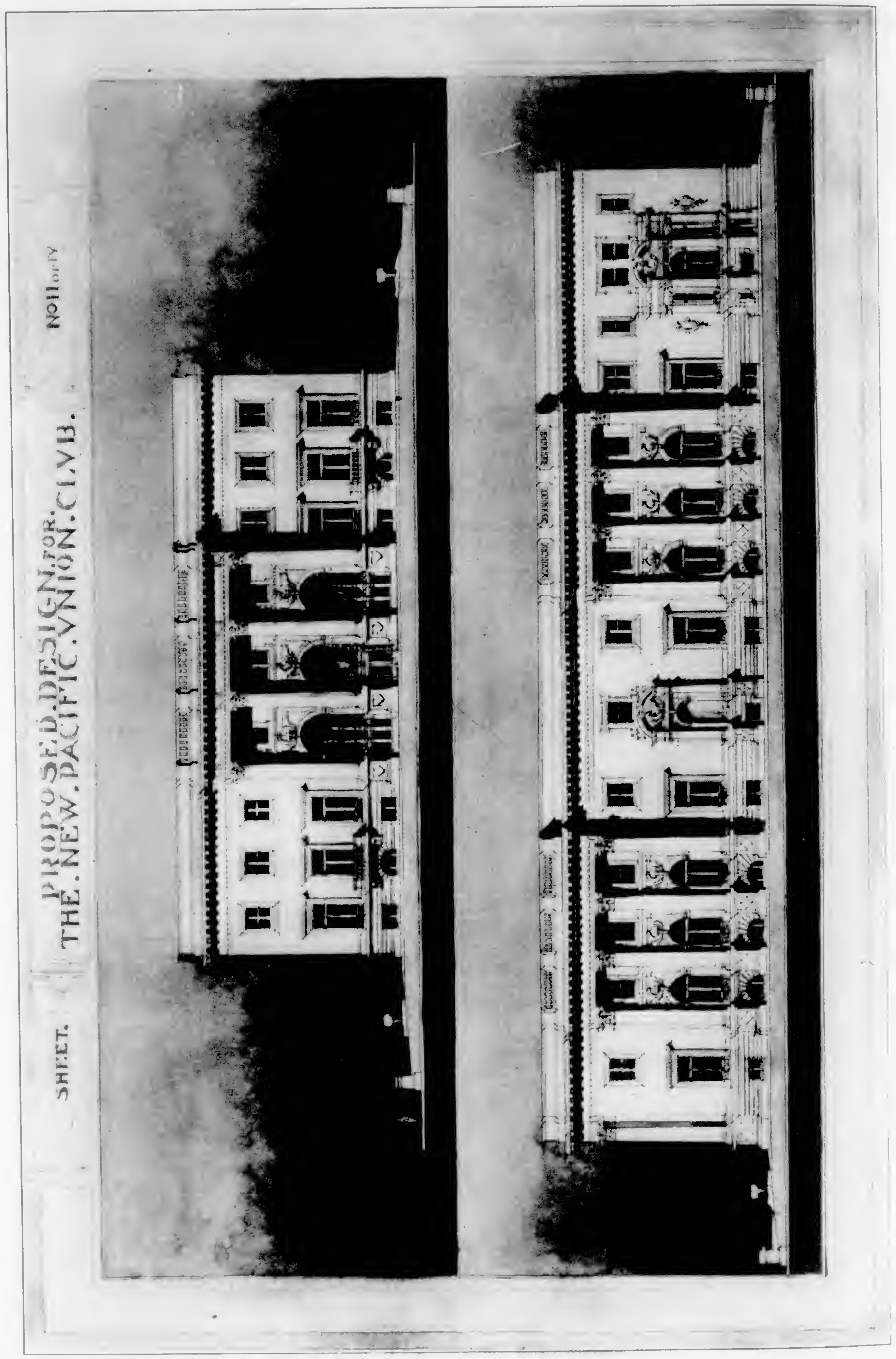
"The building now on the lot is approximately 128 feet by 105 feet.

"The club membership to be provided for may be estimated at 800.

"The space area for the principal rooms should be approximately as follows, viz:

Social hall	3000	square	feet.
Dining room (main)	2600	"	"
Breakfast room	1000	"	"
(Eastern exposure desirable.)			
Two private dining rooms, each	500	"	"
Card room	1500	"	"
Billiard room	1000	"	"
Library	1800	"	"

"Bed-rooms to the number of 40 to 50 should be provided, all with bath attached, and as a minimum to each room about 225 square feet.



Proposed Design for Pacific Union Club Building, San Francisco
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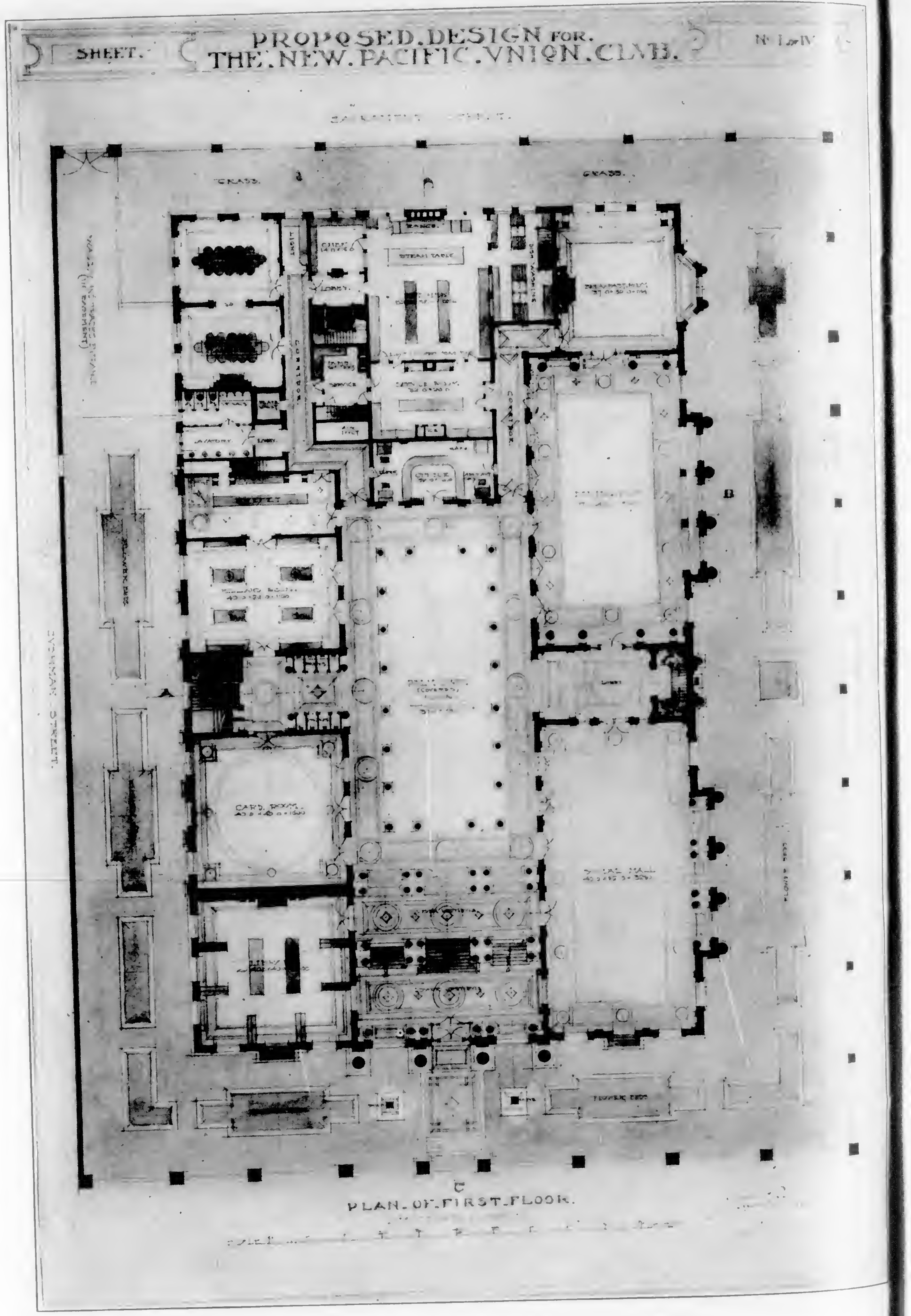
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No I of IV
CARD ROOM
PLAN. OF. FIRST. FLOOR.

Proposed Design for Pacific Union Club Building, San Francisco
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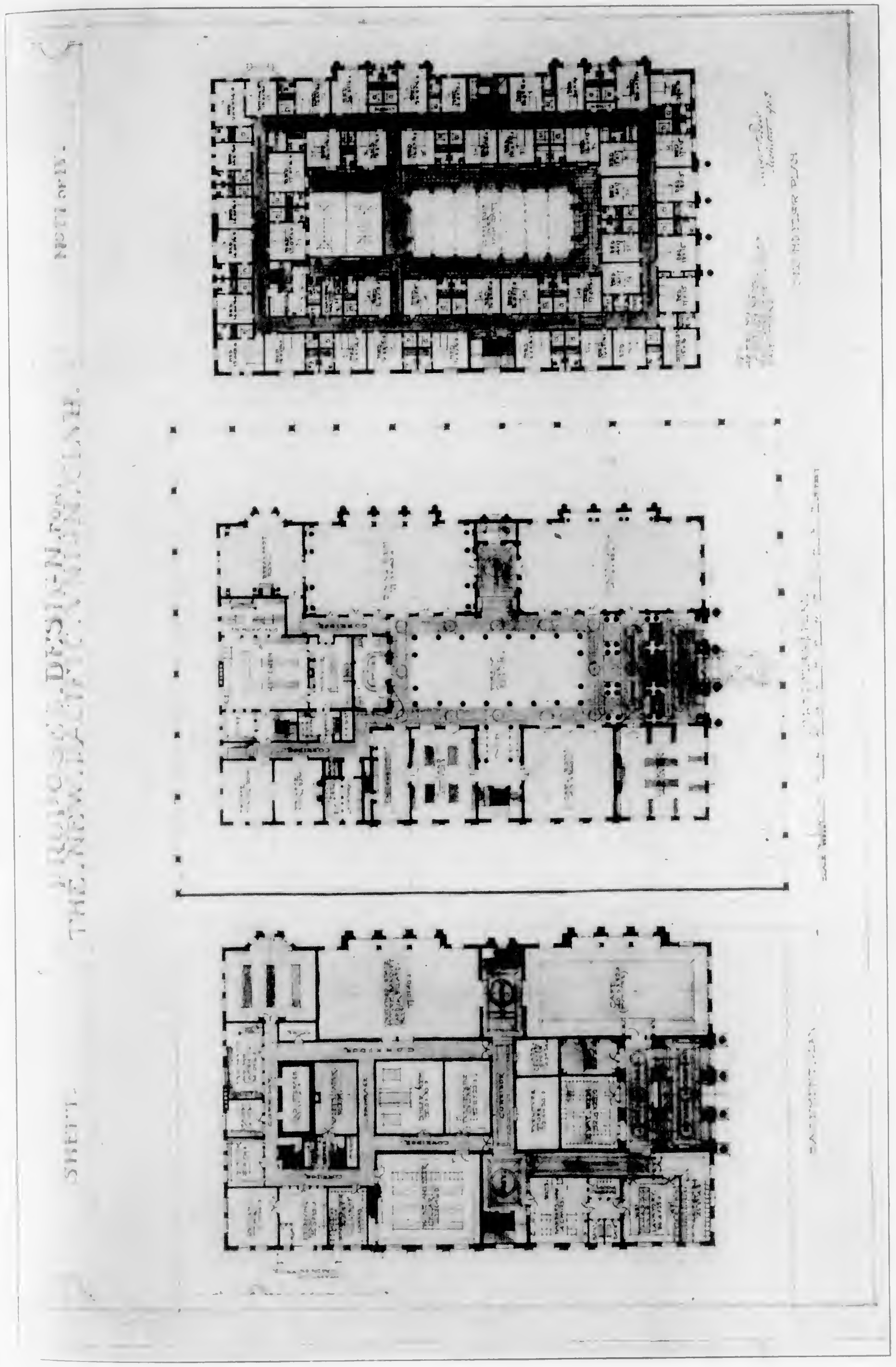
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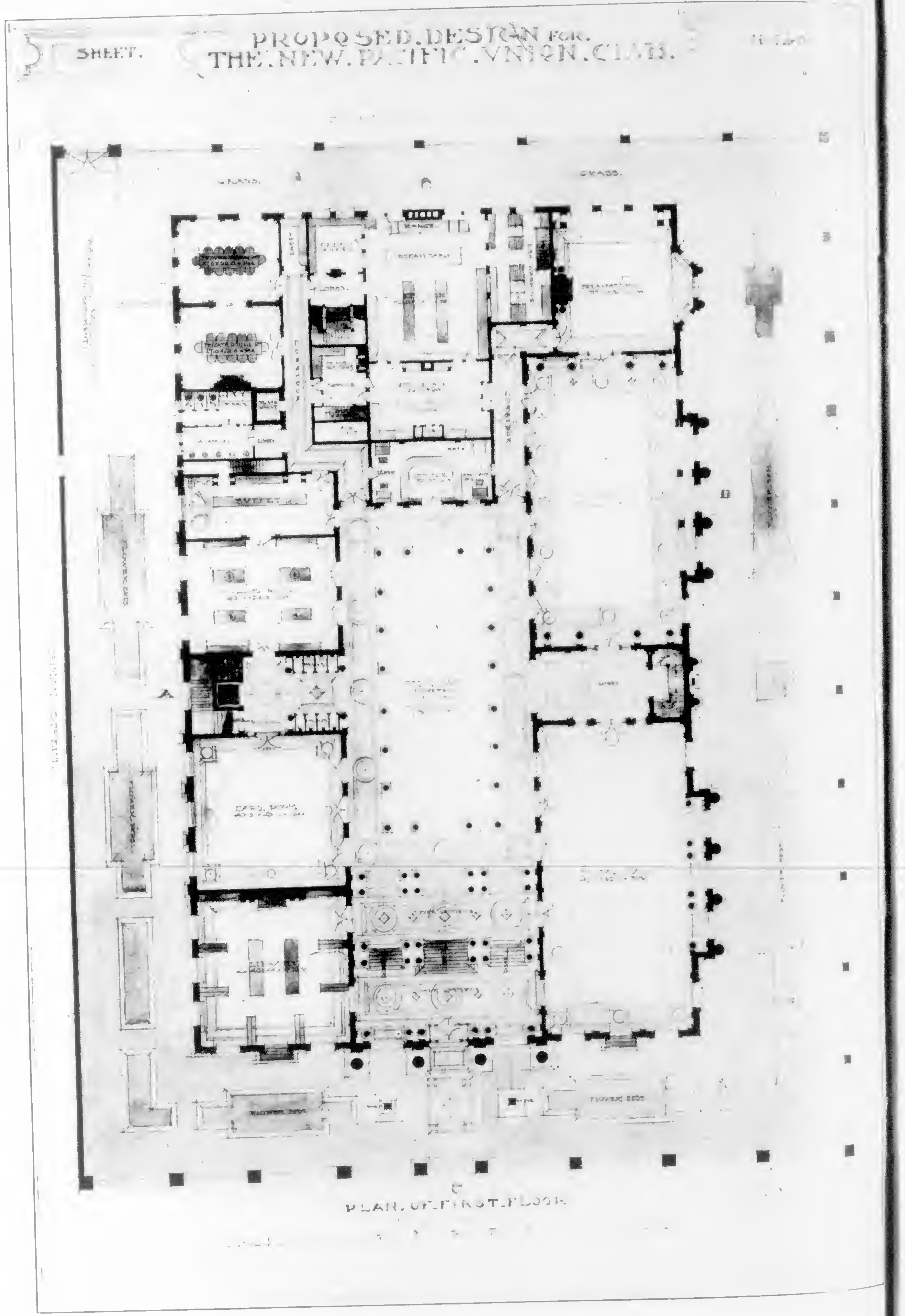
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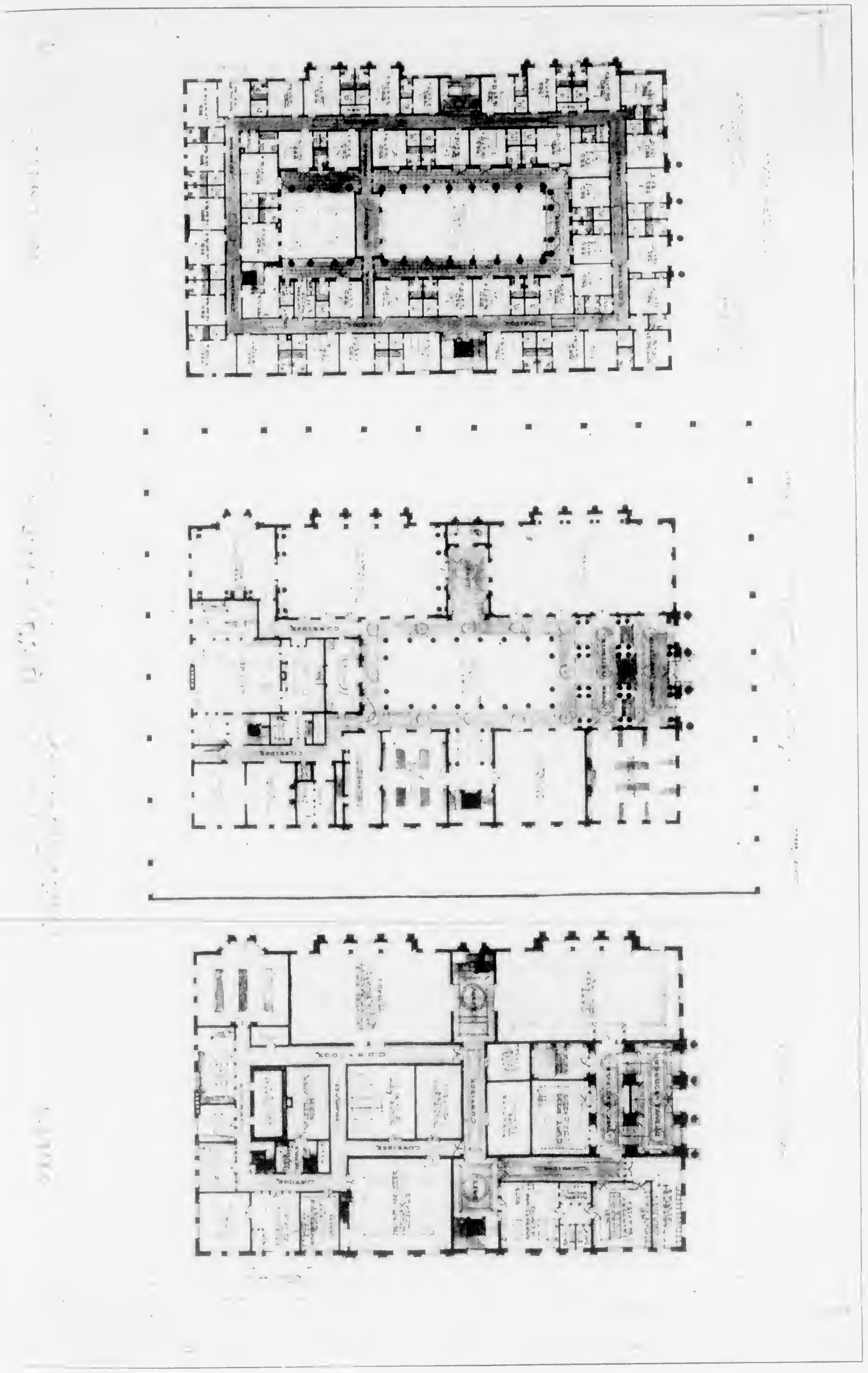

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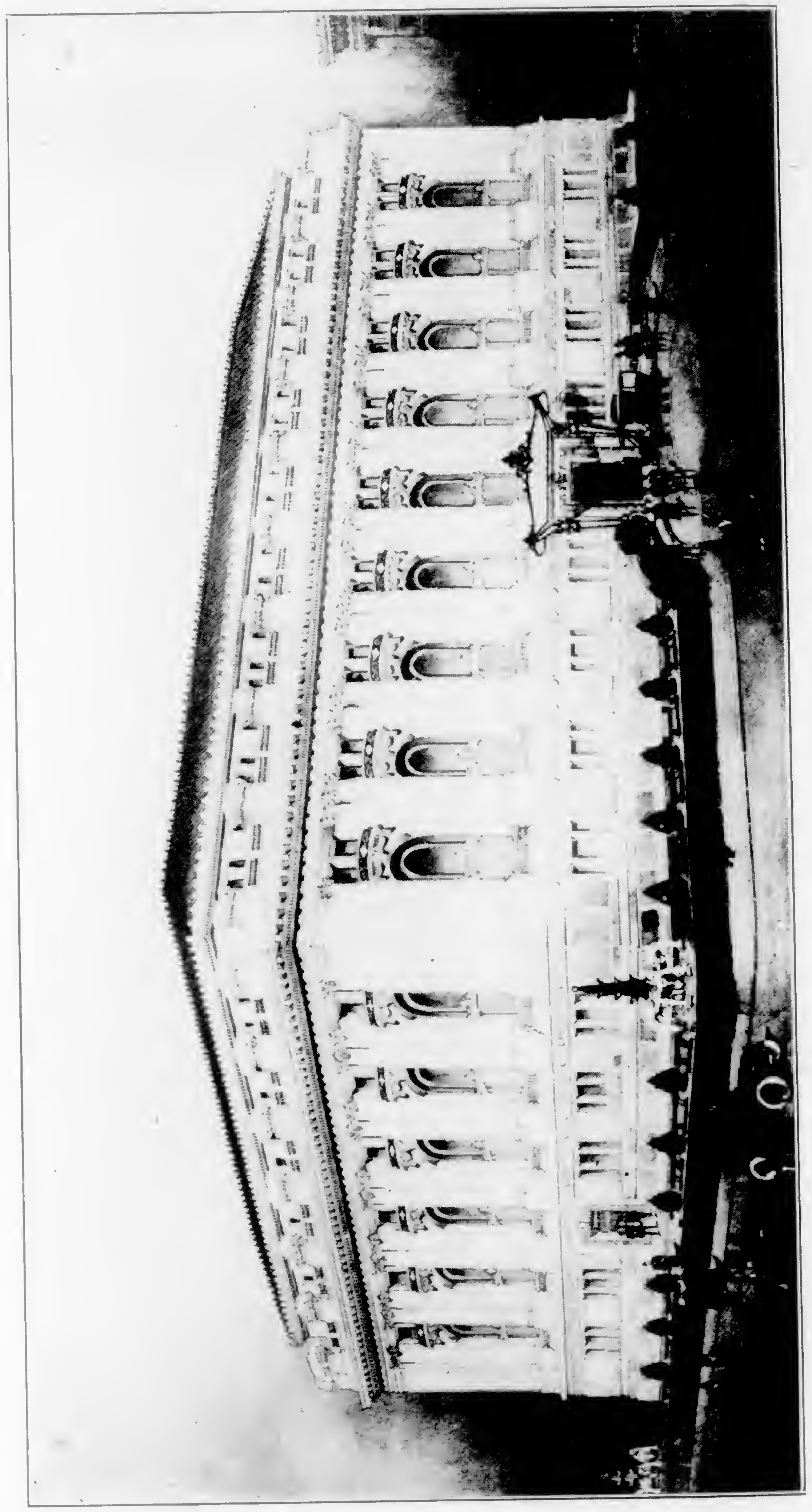

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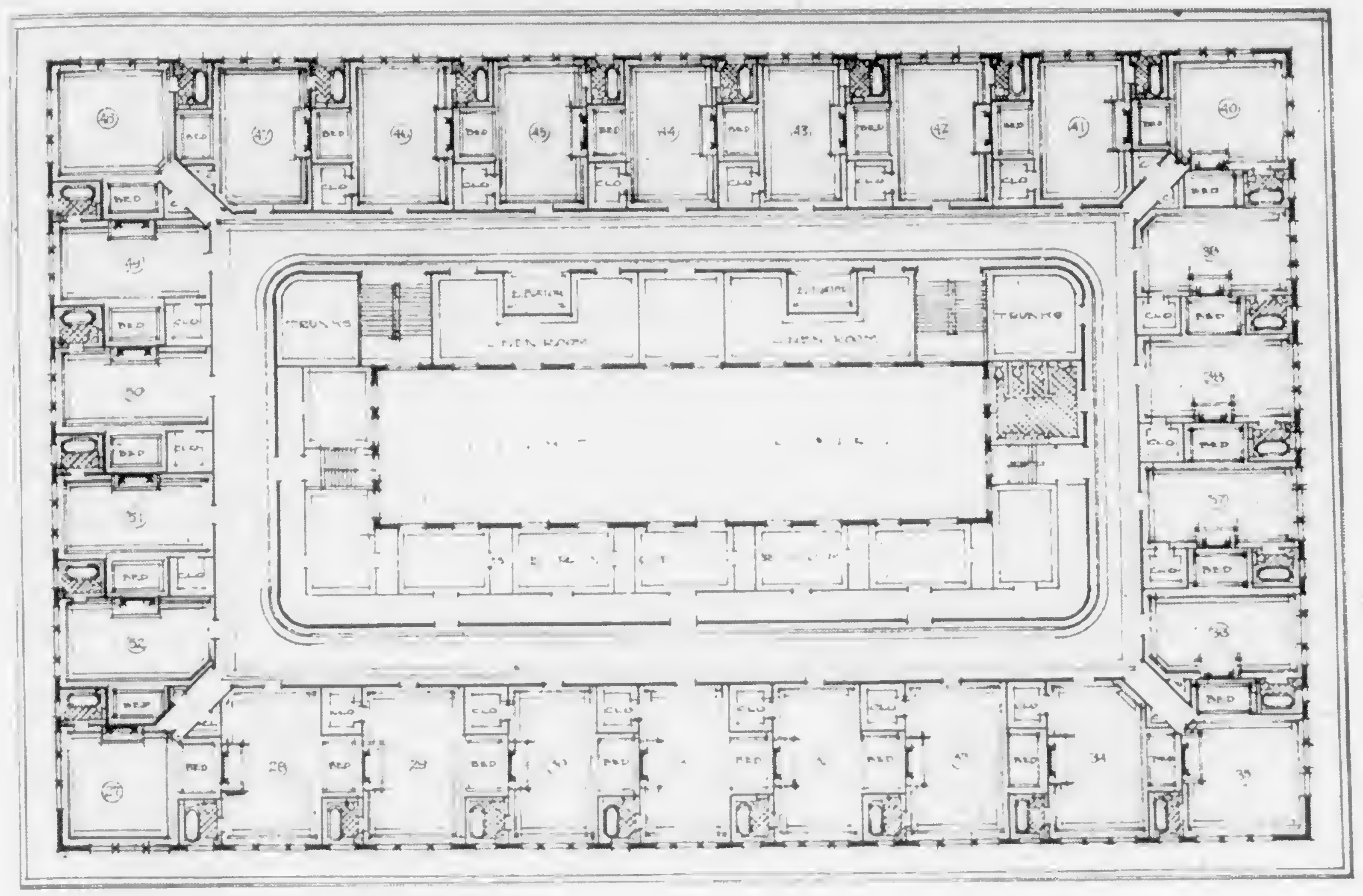
MacDonald & Applegarth, Architects



Second Floor Plan for Pacific Union Club Building, San Francisco
MacDonald & Applegarth, Architects

"Kitchen, etc., to be in proportion.

"These dimensions are given rather as suggestions than as directions.

"Competitors are requested to submit separate designs, as follows, viz:

"First.—For a club house utilizing in great part the walls and material of the partially destroyed building, now on the property, with necessary changes.

"Second.—For a club house of different dimensions, but utilizing the stone used in the present building.

"Third.—For a club house to be erected of other material, to be named by the competitor, irrespective of the present building, with the exception of the basement.

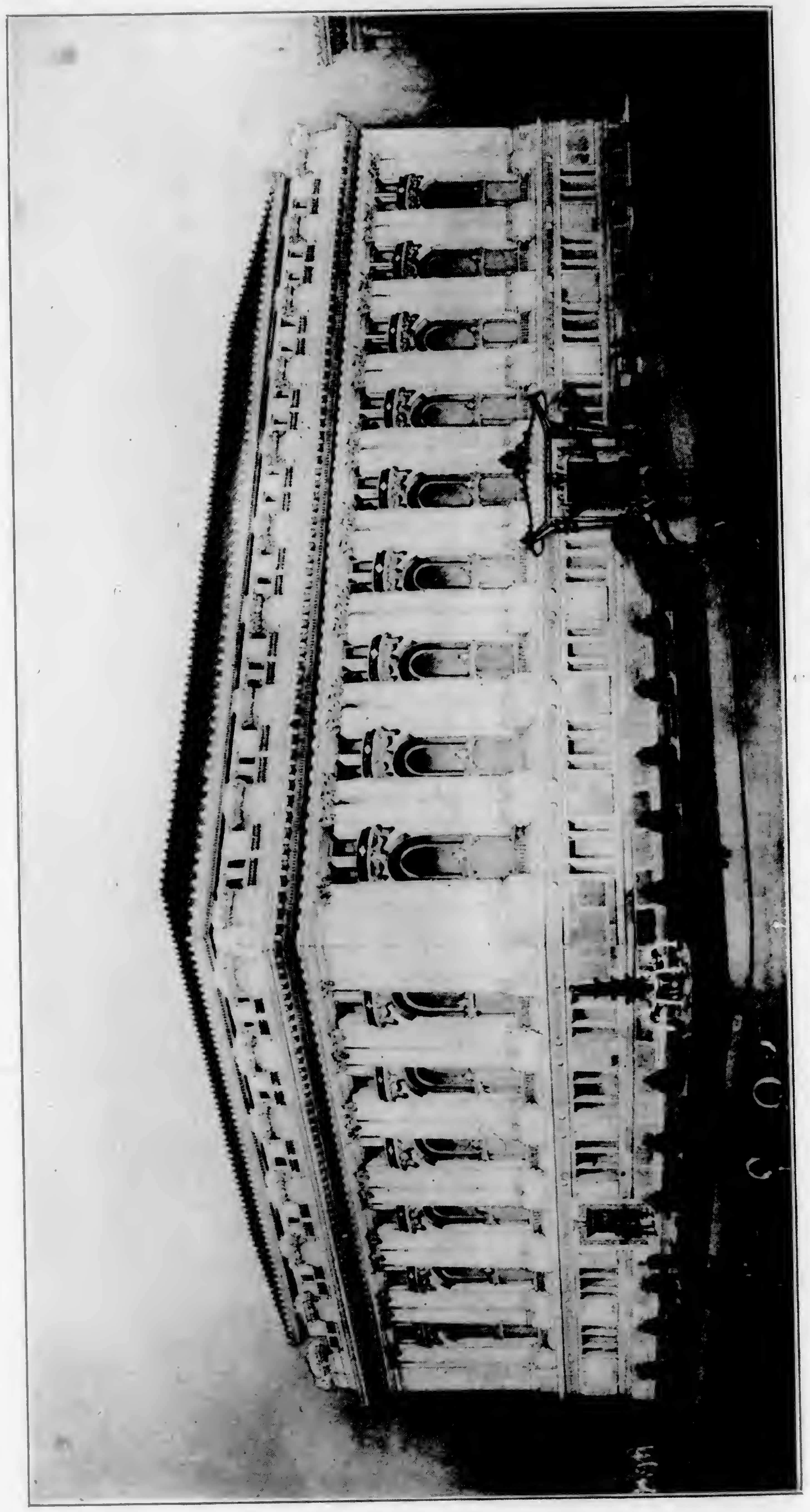
"Competitors, if they desire, may furnish only one design based entirely on the use, in whole or in part, of the walls now standing upon the property, or without regard to such walls.

"All plans to be for 'A' construction, and drawn to 1/16 inch scale; elevation on ⅛-inch scale.

"The conditions as to remuneration are that the competitor submitting the design accepted shall be selected as the architect of the building, and upon its acceptance, $600 shall be paid for the design considered by the Board second in merit, and $400 for the design considered third in merit, except as hereinafter provided.

"All designs shall be submitted under an assumed name until the decisions are made.

"The Board reserves the right to reject any and all designs, or call for modification of an accepted design, the intent thereof being that the Club shall incur no liability other than payment of the awards herein provided for in event that the Board of Directors shall not accept any of the designs submitted for its consideration; and in the event that no design is accepted, the competitor furnishing the design deemed by the Board the most meritorious shall receive $1000 therefor, and the competitor submitting the next meritorious design shall receive $400 therefor.



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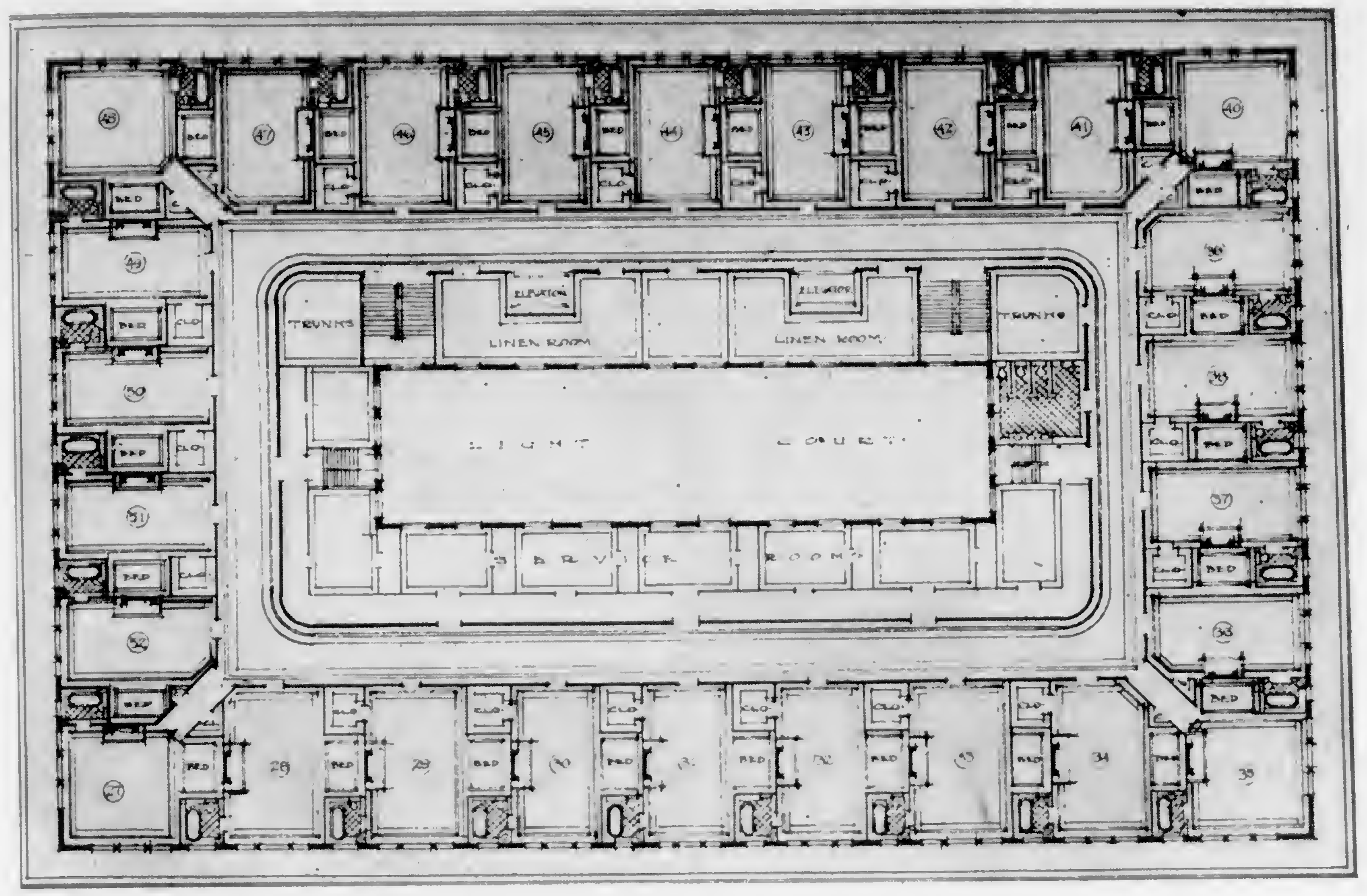

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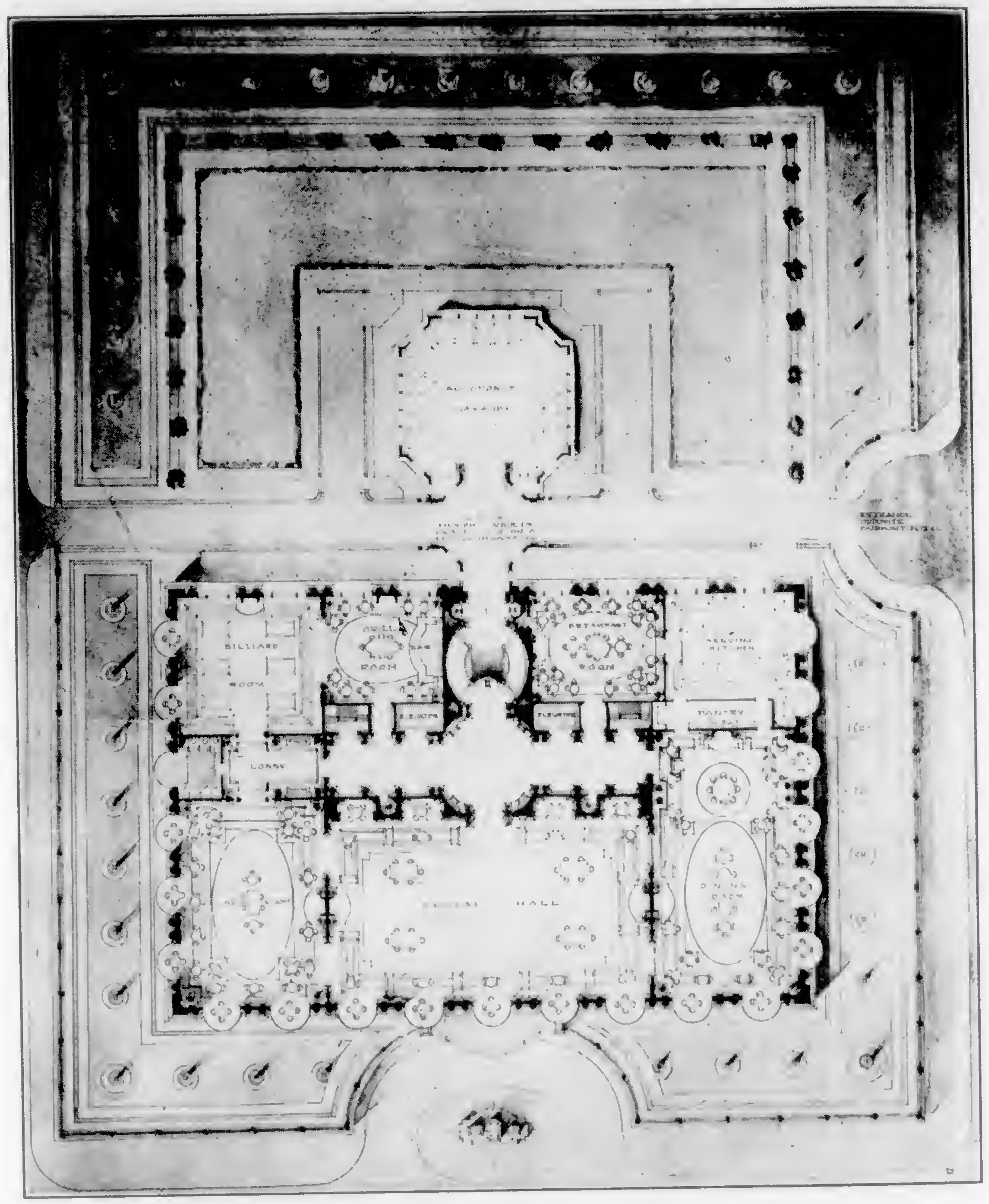

BILLIARD ROOM
GRILL ROOM
BAR
BREAKFAST ROOM
SERVING KITCHEN
LOBBY
ELEVATOR
PANTRY
HALL
DINING ROOM
ENTRANCE OPPOSITE FAIRMONT HOTEL

First Floor Plan for Pacific Union Club Building, San Francisco
MacDonald & Applegarth, Architects

"All designs are to be addressed to 'President, The Pacific-Union Club,' and marked 'Competitive Designs,' and delivered at the Club, corner of Franklin and Washington streets, not later than noon of the fifteenth day of January, 1908.

"Yours truly,

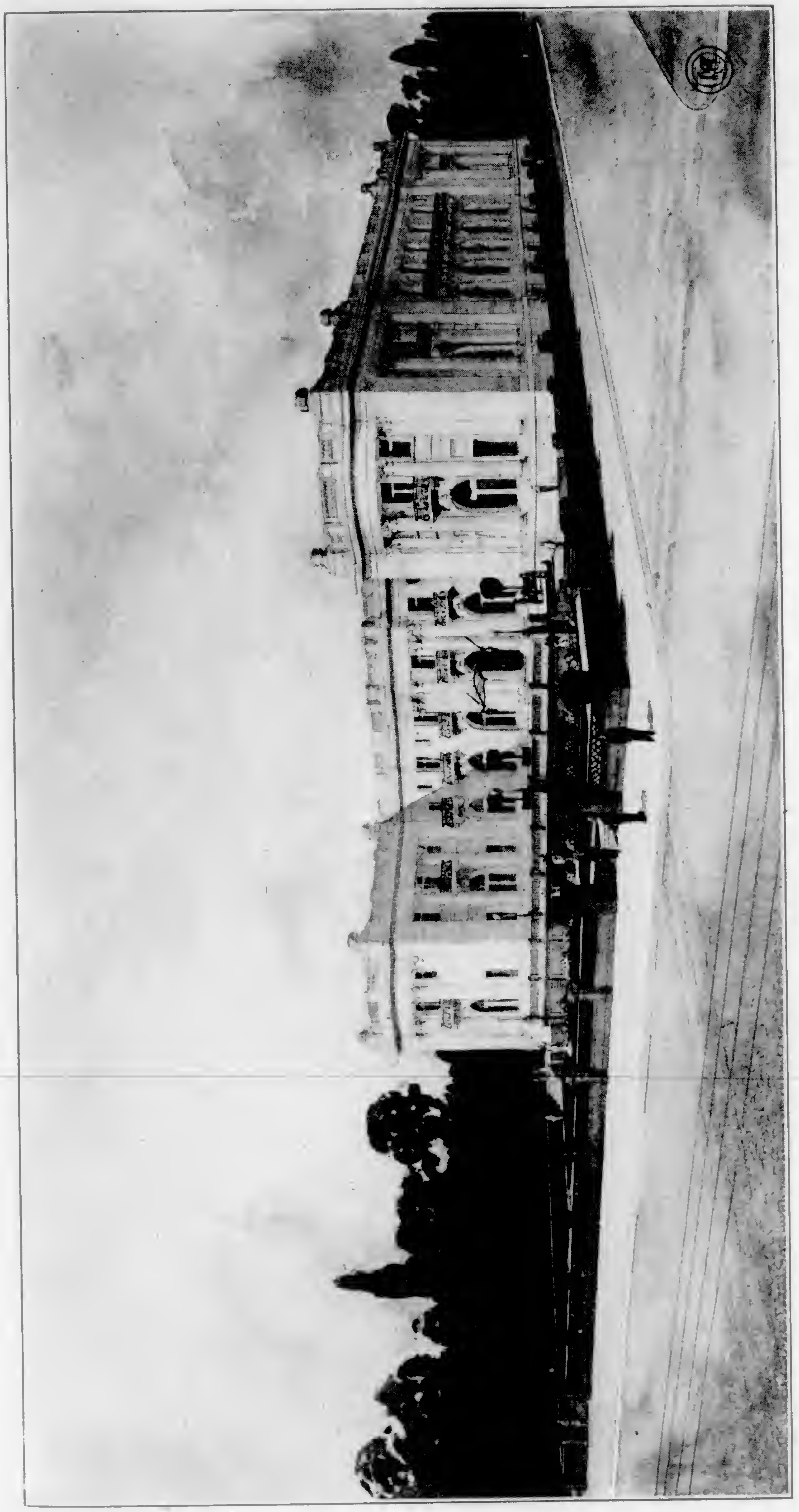
Edgar J. De Pue,
(signed), President Pacific-Union Club."

* * *

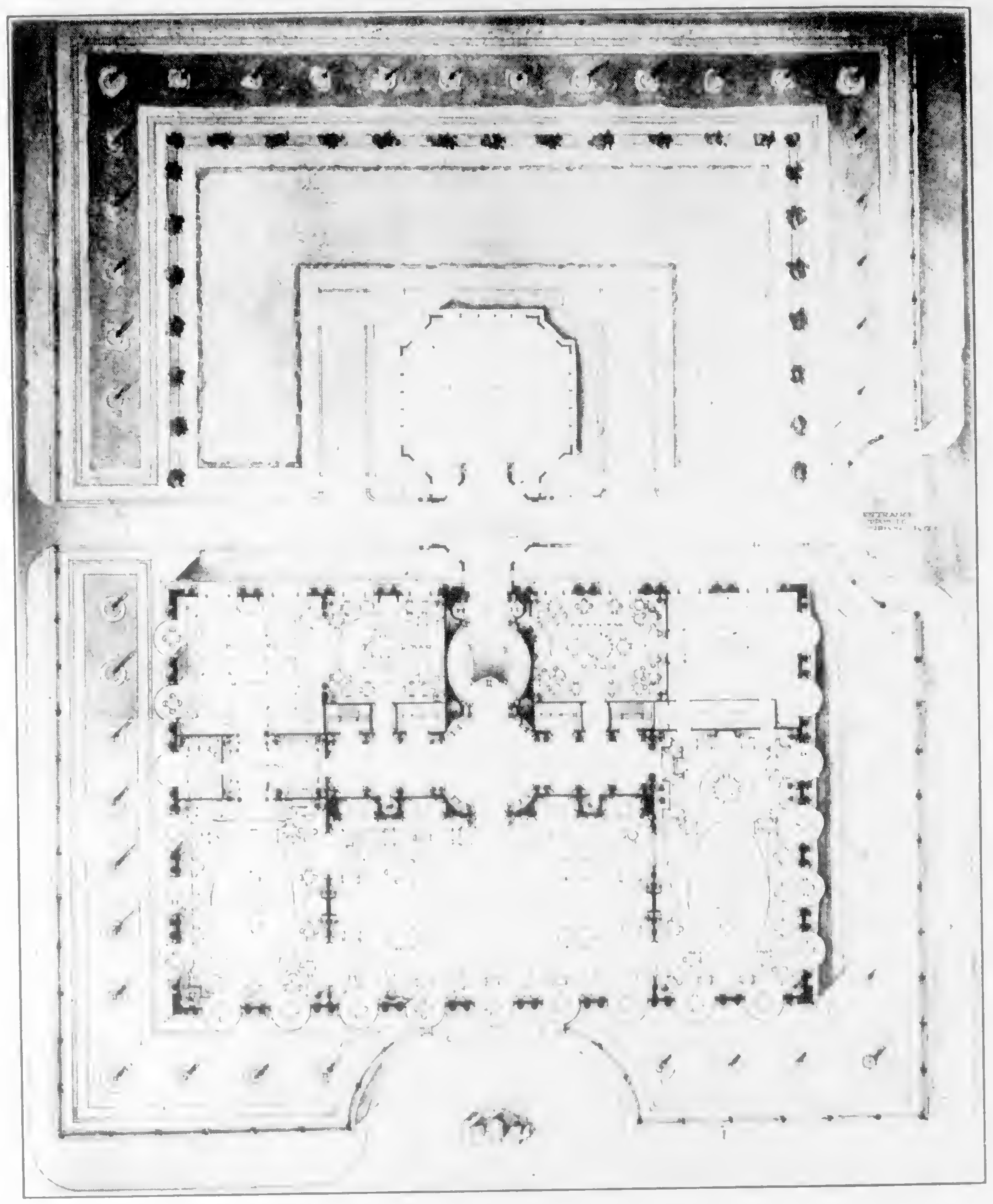
"I tell you wat," said the first kid, "we ought to be mighty thankful that our folks use gas stoves."

"Why?" asked the second kid.

"Coz nobody was ever asked to split wood for a gas stove, was they?"



Competitive Design for Pacific Union Club Building, San Francisco. Sutton & Weeks, Architects



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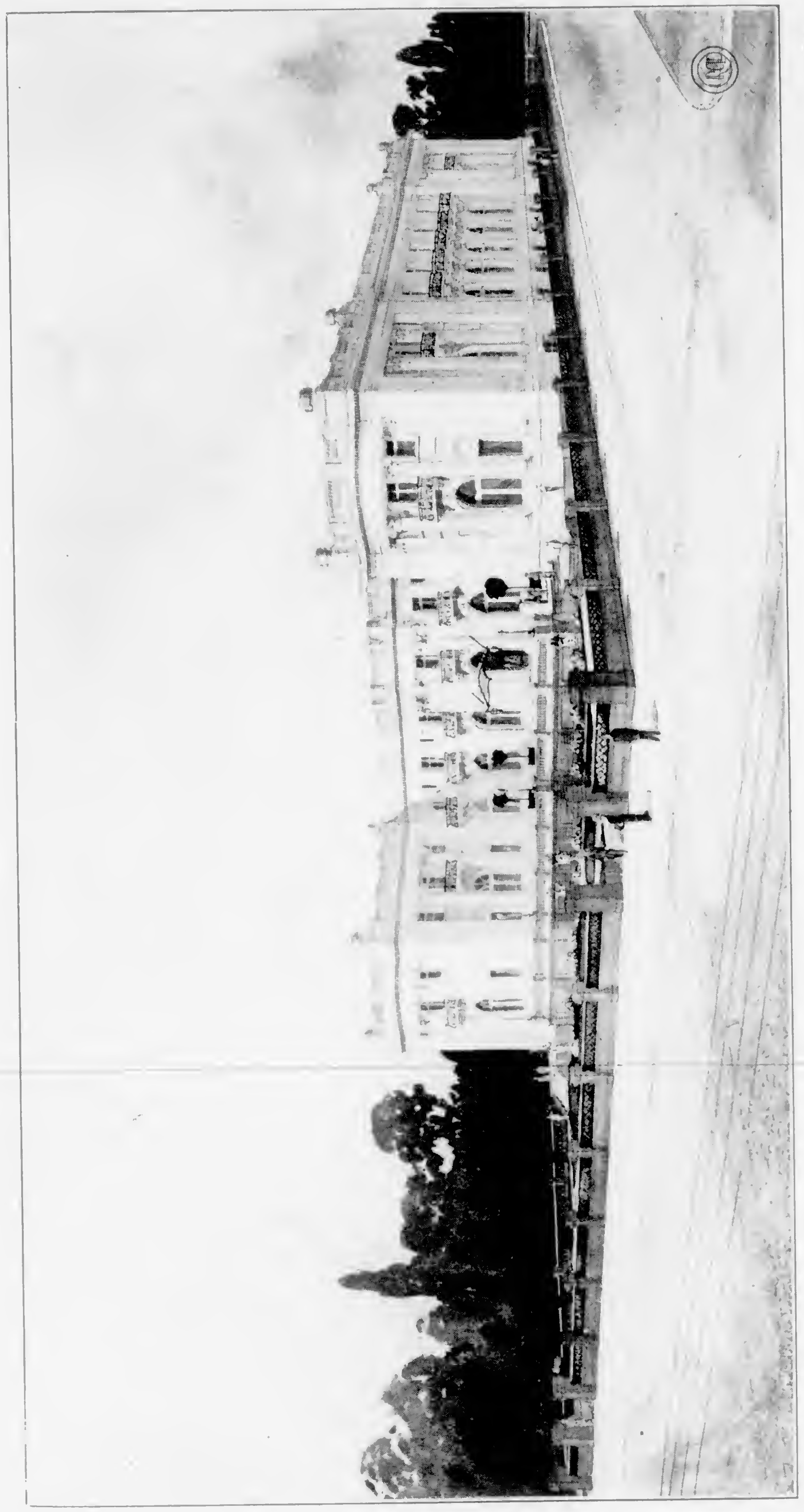

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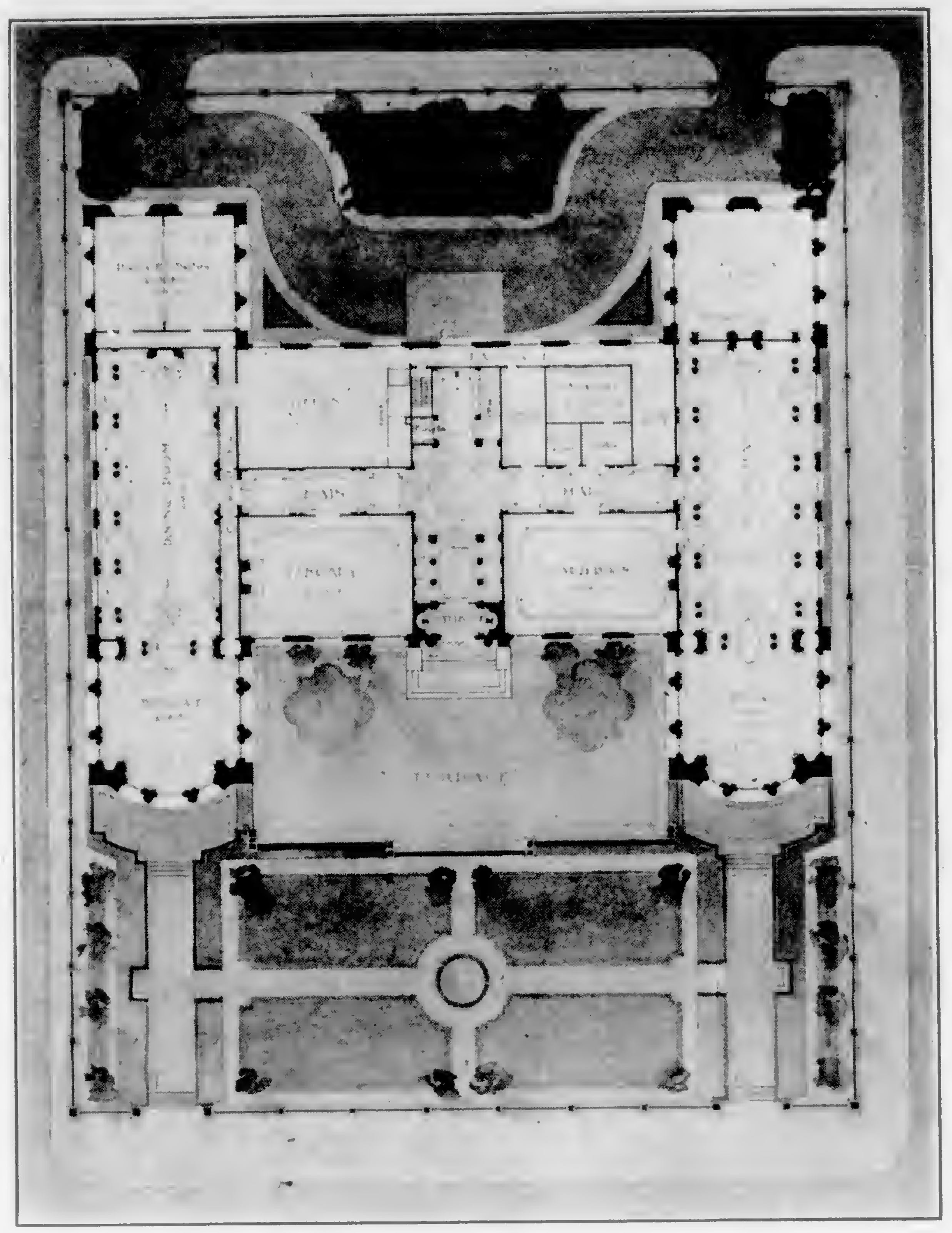


Ground Floor Plan for Pacific Union Club Building, San Francisco
Sutton & Weeks, Architects

Optimist Club Philosophy

Clearing house certificates and tight financial conditions have afforded more people who never had a dollar, an excuse for their hard luck stories than anything that has happened since the Civil War.

The optimism of the optimist destroys the last hope of the pessimist.

Lots of people we know have no other excuse for living except the fact that their fathers were born first.

An unkind, spiteful, venomous word is the product of a heart that would do worse if it wasn't watched.

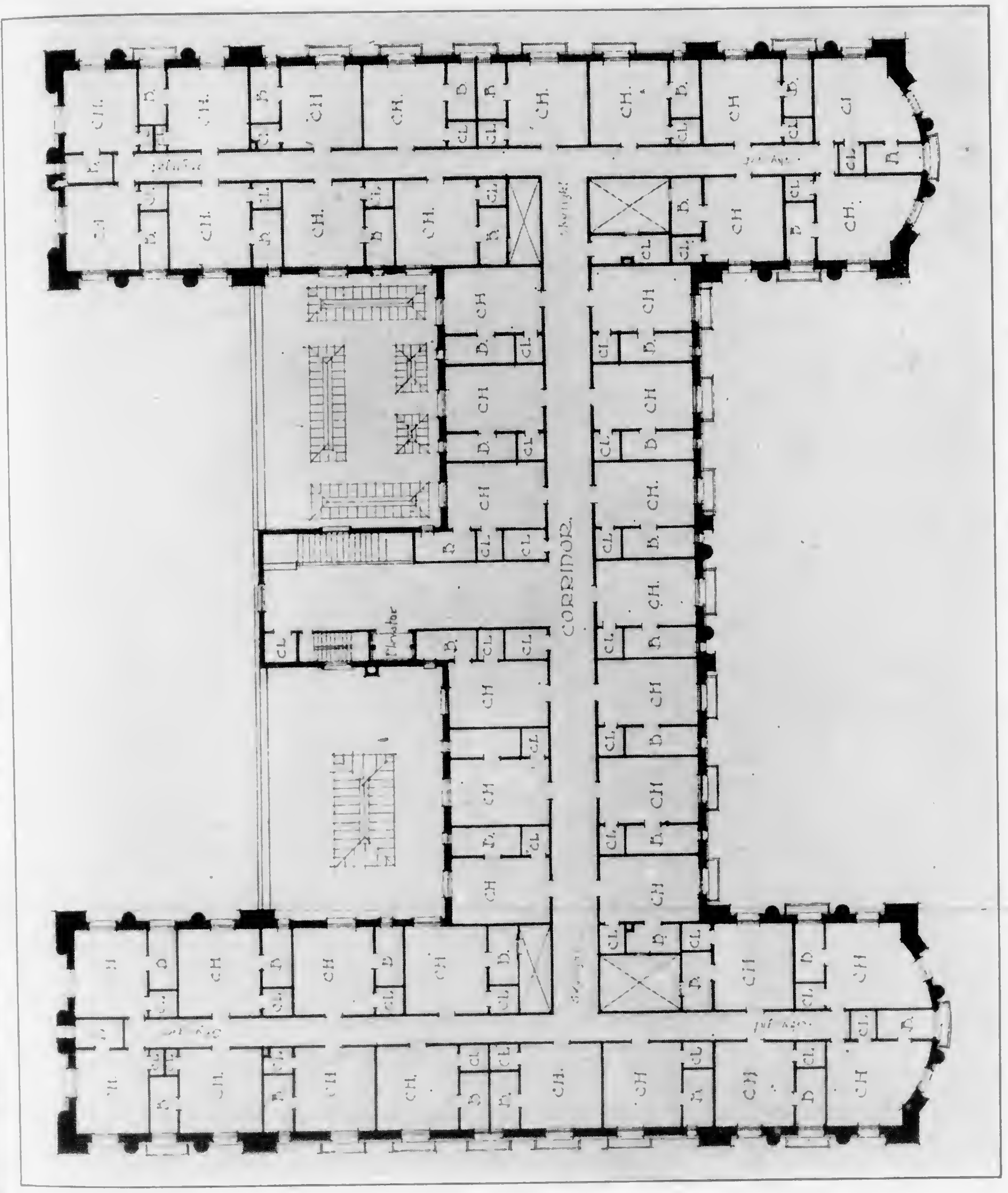
A waiting expectant wife, a spoilt dinner sacrificed to just another drink, is a sure way to cremate her love on the altar of your selfishness.

If you were to treat your friends as you do your stomach, you wouldn't have a friend on earth in sixty days.

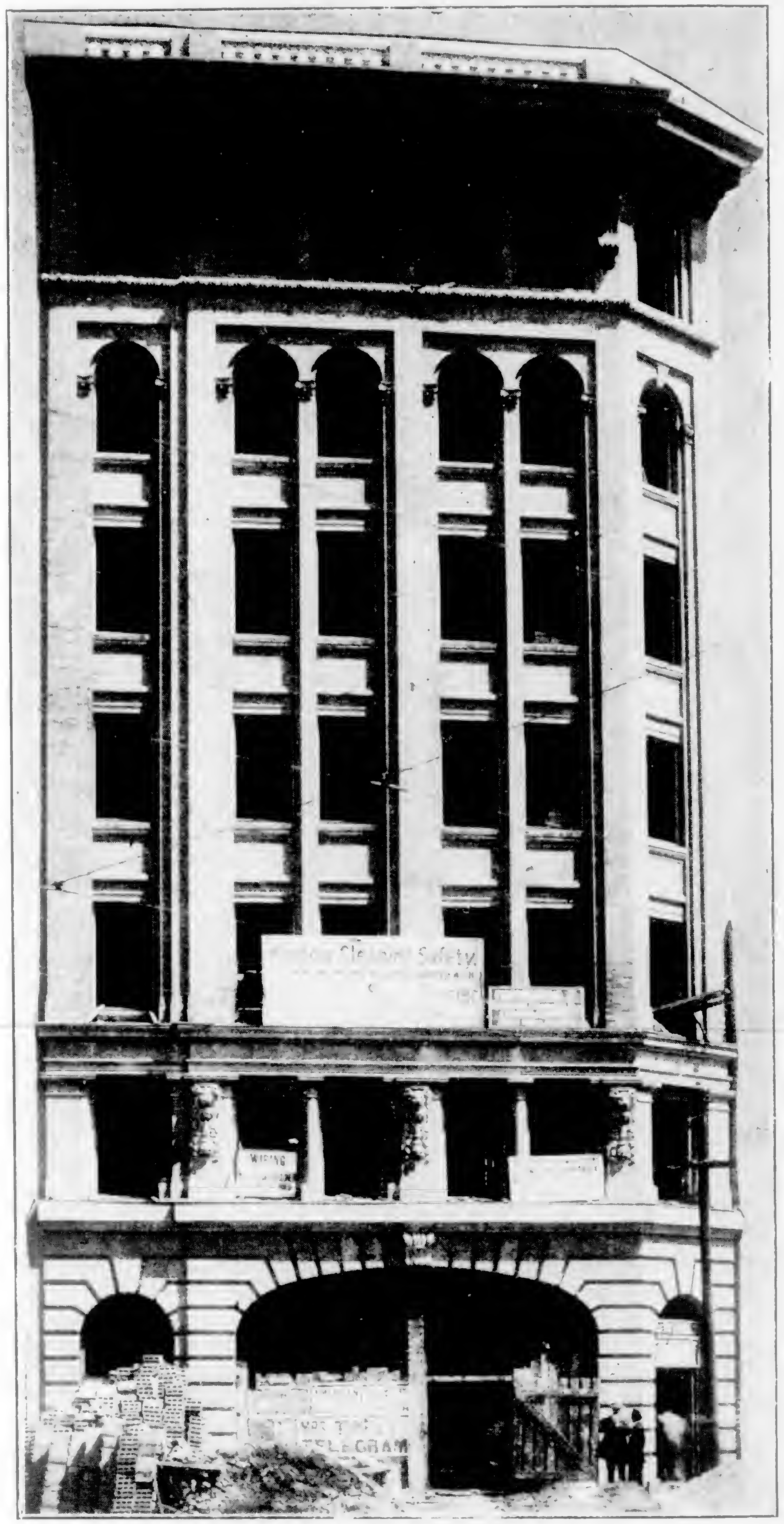
An optimist strikes out the first two letters from "impossible," and then starts in to prove it.

The man who can sculpture a stumbling-block into a stepping-stone has done more than most sculptors ever accomplished.

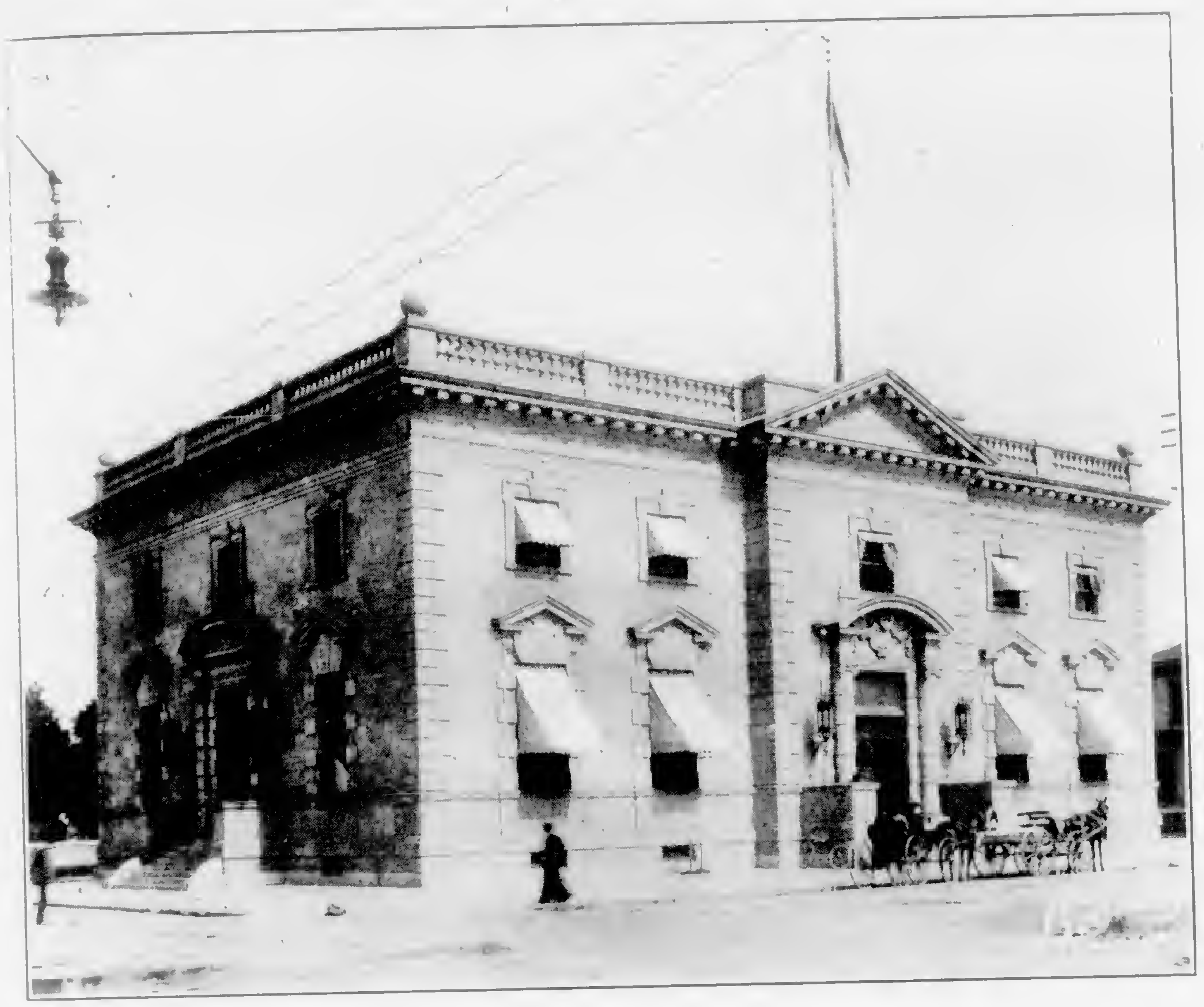
A few punctured tires on the financial automobile is no valid reason why we should throw the entire machinery on the scrap heap.



Second Floor Plan for Pacific Union Club Building, San Francisco. Sutton & Weeks, Architects



Koshland Building, San Francisco.   Landsburg & Joseph, Architects
Fireproofing and Hollow Tile Partitions by Continental Fireproofing Company
Hausmann Sash Carriers used on all windows. Equipped with Otis Elevators



Post Office Building, Stockton, Cal.   James Knox Taylor, Architect

The Architectural Treatment of California Federal Buildings

By WILLIAM A. NEWMAN, Architect

DOTTED all over our fair state new federal buildings are springing up, and so familiar is this sight becoming, of beautiful structures which are an inspiration and a lasting credit to the people of their several communities, that we are in danger of overlooking and omitting due measure of credit to the source whence come these enduring monuments of utility, beauty and art. And while we may occasionally acknowledge that they are the bountiful expressions of a generous and prosperous nation, in that these liberal appropriations which have for years past been steadily pouring into our state additional prosperity and growth at each session of Congress, it behooves us well not to overlook the source whence they emanate, to see that they are not cut down or discontinued, but that they are continually added to, as the influx of population and the development of our resources demand.

I have been asked many times by visitors from the eastern states how it is that we Californians are so far ahead of them in the matter of federal appropriations and buildings, when we are relatively a younger state with a smaller population, and far removed from the halls of Congress. How have we been enabled to unlock the strongly guarded vaults of Uncle

Window Cleaning Safety
Hausmann Sash Carriers
WIRING
AMERICAN
MRS. TEMPLE'S
TELEGRAM

Koshland Building, San Francisco. Landsburg & Joseph, Architects
Fireproofing and Hollow Tile Partitions by Continental Fireproofing Company
Hausmann Sash Carriers used on all windows. Equipped with Otis Elevators

Post Office Building, Stockton, Cal. James Knox Taylor, Architect

The Architectural Treatment of California Federal Buildings

By WILLIAM A. NEWMAN, Architect

DOTTED all over our fair state new federal buildings are springing up, and so familiar is this sight becoming, of beautiful structures which are an inspiration and a lasting credit to the people of their several communities, that we are in danger of overlooking and omitting due measure of credit to the source whence come these enduring monuments of utility, beauty and art. And while we may occasionally acknowledge that they are the bountiful expressions of a generous and prosperous nation, in that these liberal appropriations which have for years past been steadily pouring into our state additional prosperity and growth at each session of Congress, it behooves us well not to overlook the source whence they emanate, to see that they are not cut down or discontinued, but that they are continually added to, as the influx of population and the development of our resources demand.

I have been asked many times by visitors from the eastern states how it is that we Californians are so far ahead of them in the matter of federal appropriations and buildings, when we are relatively a younger state with a smaller population, and far removed from the halls of Congress. How have we been enabled to unlock the strongly guarded vaults of Uncle

Sam's treasury and secure such substantial results, while they, in their state in the east, more thickly populated and with urgent necessities have to rest content with little or none?

We are, indeed, proud to be Californians. Here is a state where they do things. Opportunity beckons on every hand; and the poorest toiler of today may be the rich man of tomorrow. For the stranger our hearts and arms are wide open, and a certain welcome awaits the new-comer, for we have a plenty here and to spare.

What is the secret of our success with the national appropriations? May it not be found in the unity of action which has hitherto characterized our congressional delegation? Again, may we not be proud that we have selected vigorous, forceful men, giants of their class, wise masters of long experience, to represent us in the councils of the nation, returning them again and again to their seats at Washington to wrest larger and larger appropriations for the further prosperity and upbuilding of our state.

We note the coming expiration of the term of one of our senators, long tried and found worthy; whose record is second to none—a record of works, not words. We trust Senator Perkins, who is an indefatigable worker for this state, will be re-elected by a unanimous vote.

I have been often asked: Are these appropriations wisely expended or not? In answer, it would seem that there is much merit in the system which has been adopted by the government for the erection of federal buildings, under the Civil Service and the present regulations of open competitive bidding.

A comparatively small but nevertheless interesting building is the U. S. Post Office and Court House at Fresno, Cal., which has just been completed, designed by Supervising Architect, James Knox Taylor, of the Treasury Department, and erected under the direction of Superintendent F. L. Lacaff.

The building is of the class "B" type, with two stories and basement. Dimensions, 84 x 100 ft. with a floor area of 7182 sq. ft.

The exterior facing is gray pressed brick with Bedford, Ind., limestone trimmings and granite steps. The ornamental lamps at the entrances add to the treatment of this exterior.

The main lobby and the toilet rooms are wainscoted with Vermont marble, and the interior wood finish is of oak and hard pine, with plain plasterwork. An ornamental cast and wrought iron stairway leads to the second story where the federal court room is located.

This building has been erected at a cost of 33 cents per cubic foot, including heating plant and electric wiring.

The U. S. Post Office at Stockton, Cal., completed in 1902, shows another treatment of a similar problem by Architect Taylor, which cost the same rate per cubic foot, viz.: 33 cents. The dimensions are 70 x 100 ft. This building is also of the class "B" type, two stories and basement. The exterior facing is Kyune (Utah) sandstone with granite steps. The corridor is finished with plain marble, and the interior woodwork is oak and pine. A small heating plant is located in the basement.

There are quite a number of interesting post office buildings in this state and many more are soon to be erected, but the above are typical of the treatment by Architect Taylor of the smaller class of inland federal buildings.

Taking a glance at a typical building such as we have illustrated let us examine a few of the problems presented to the architect.

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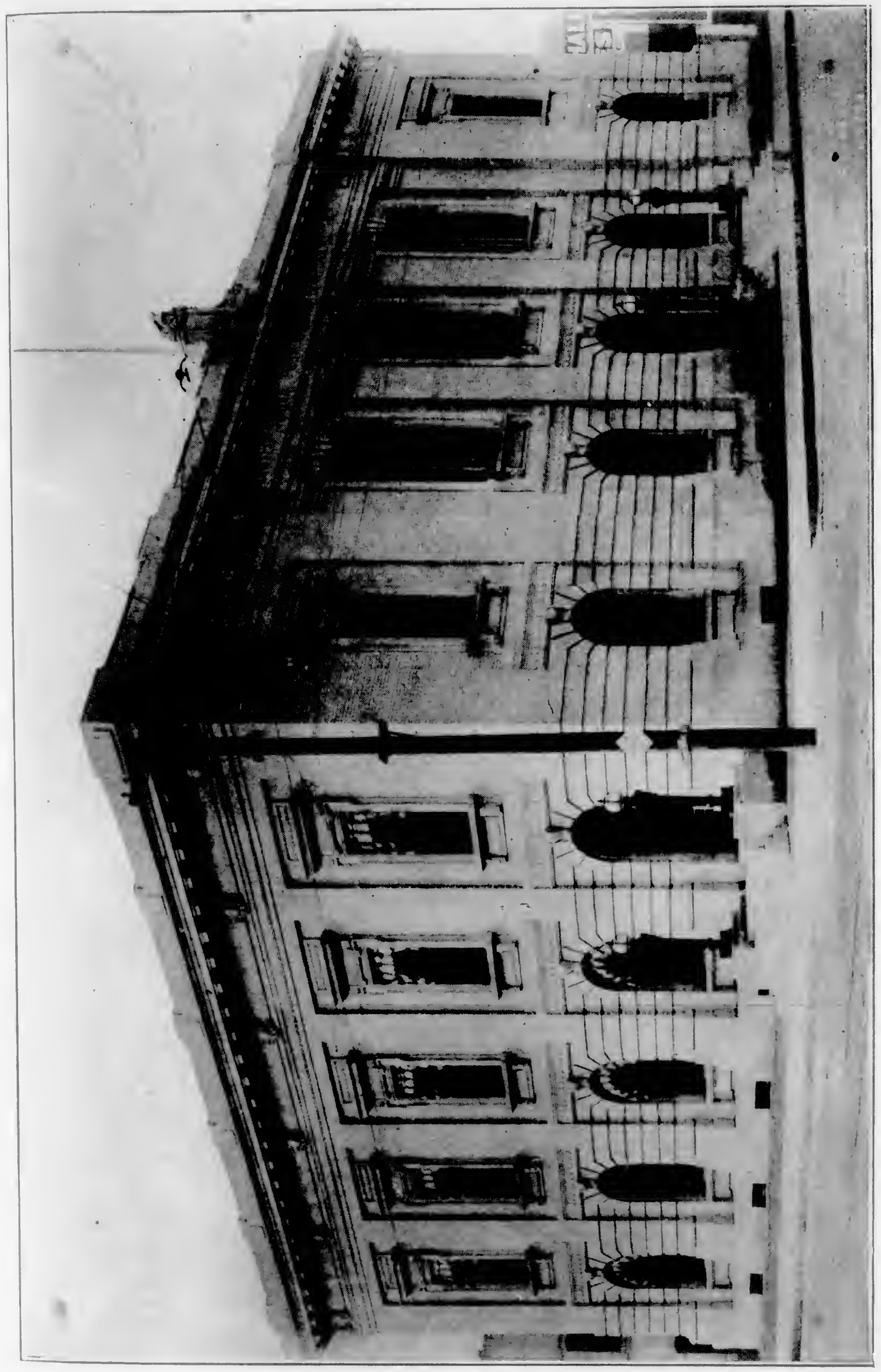

New Post Office Building, Fresno, Cal. James Knox Taylor, Architect. Electric Wiring and Fixtures by Steger Electrical Company, Fresno

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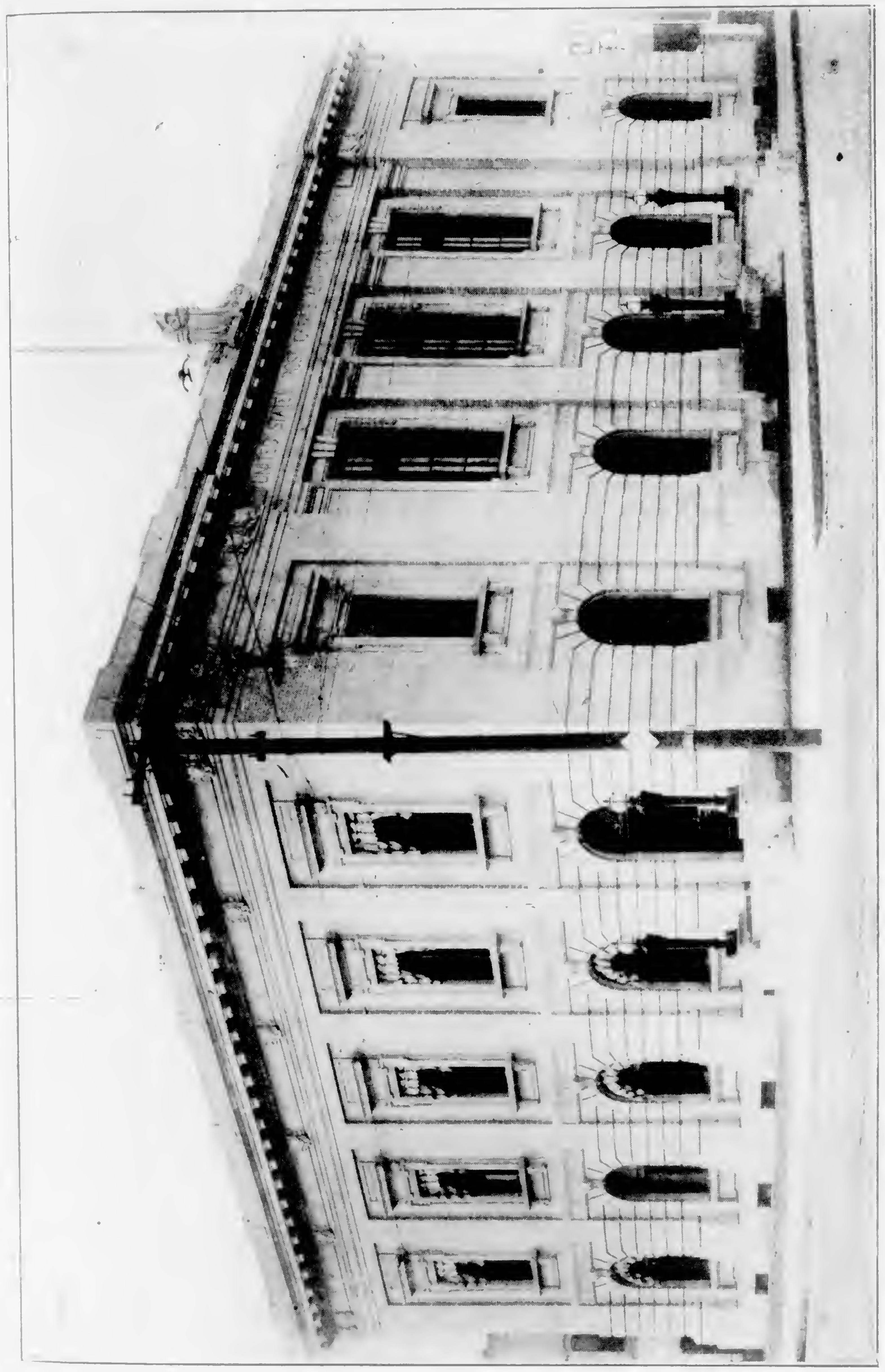

New Post Office Building, Fresno, Cal. James Knox Taylor, Architect. Electric Wiring and Fixtures by Steger Electrical Company, Fresno in keeping with the dignity of our nation and its high ideals, not only in the design and execution but in the enduring nature of the very materials themselves, our attention is drawn to the plan, which it is self-evident from the character of the business to be conducted presents similar features in all post offices.

The position of the lobby or public corridor where access is had to the post office boxes and general delivery windows practically determines the other assignments. In a typical building such as we illustrate, it is placed along the main facade, with a division at one end for registry and money orders, and provision at the other end for offices of the postmaster.

On the other side of the main corridor screen is situated the mailing room, or work room as it is called, where the mails are handled. Our project assigns to this room the largest area and requires that it be well lighted, preferably by a skylight, properly heated and ventilated, and on one side have a platform where the mail wagons may receive and discharge their contents. The placing of this mailing platform in the rear necessitates a driveway or approach thereto. A glance again at the site will show that there is ample room, for a law of Congress provides that there shall be an open space of 40 ft. between all new buildings and the nearest neighboring building. The wisdom of this precaution is much more apparent to the layman since the great conflagration in San Francisco.

Provision must also be made for a lounging or swing room for the carriers, and as is usual these rooms are placed in the basement.

It is the custom of Uncle Sam to provide for the secret inspection of employes in the mailing rooms and swing rooms and should any thefts be reported, the inspector may watch, unseen, for the culprit through a narrow darkened passage-way or lookout, with latticed and screened openings.

Several strong vaults lined with heavy plates and modern steel vestibule and vault doors, with combination locks, are installed for the safe keeping of the stamps and moneys in the hands of the officials, and if the amounts usually kept on hand warrant it an electrical protection is installed, which sounds an alarm should anyone be found attempting to gain entrance to the vaults.

In any city or town large enough to be honored with a federal building there are usually a number of officials occupying rented quarters, who are naturally provided for in the new building. Our program requires quarters for these officials; sometimes a land office, a small customs department, a weather bureau, or a U. S. Marshal's office. Ample office space in the upper stories, if the building has more than one story, is all that is requisite, such as may be found in any of our modern office buildings. A small court room with apartments for the judge may be required. This will also be placed in the upper story, and their treatment will depend largely upon the extent of the appropriation, being finished in wood and plaster in the smaller places, and in the larger cities with expensive marbles and ornate plaster.

The treatment of the elevations forms an inexhaustible subject. Ten or twelve years ago the design was largely Gothic or Romanesque. Today is the era of the renaissance, with its modern French, Italian or Spanish motif. Occasionally is found in our smaller federal buildings a modern classic with a strong colonial feeling.

Thus in a simple, graceful style, employing pilasters, the recessing of window openings and with ornamental features at the main entrances, through a series of adjustments and nice proportions, and the use of harmoniously contrasting constructive materials, our typical inland post office comes into being.

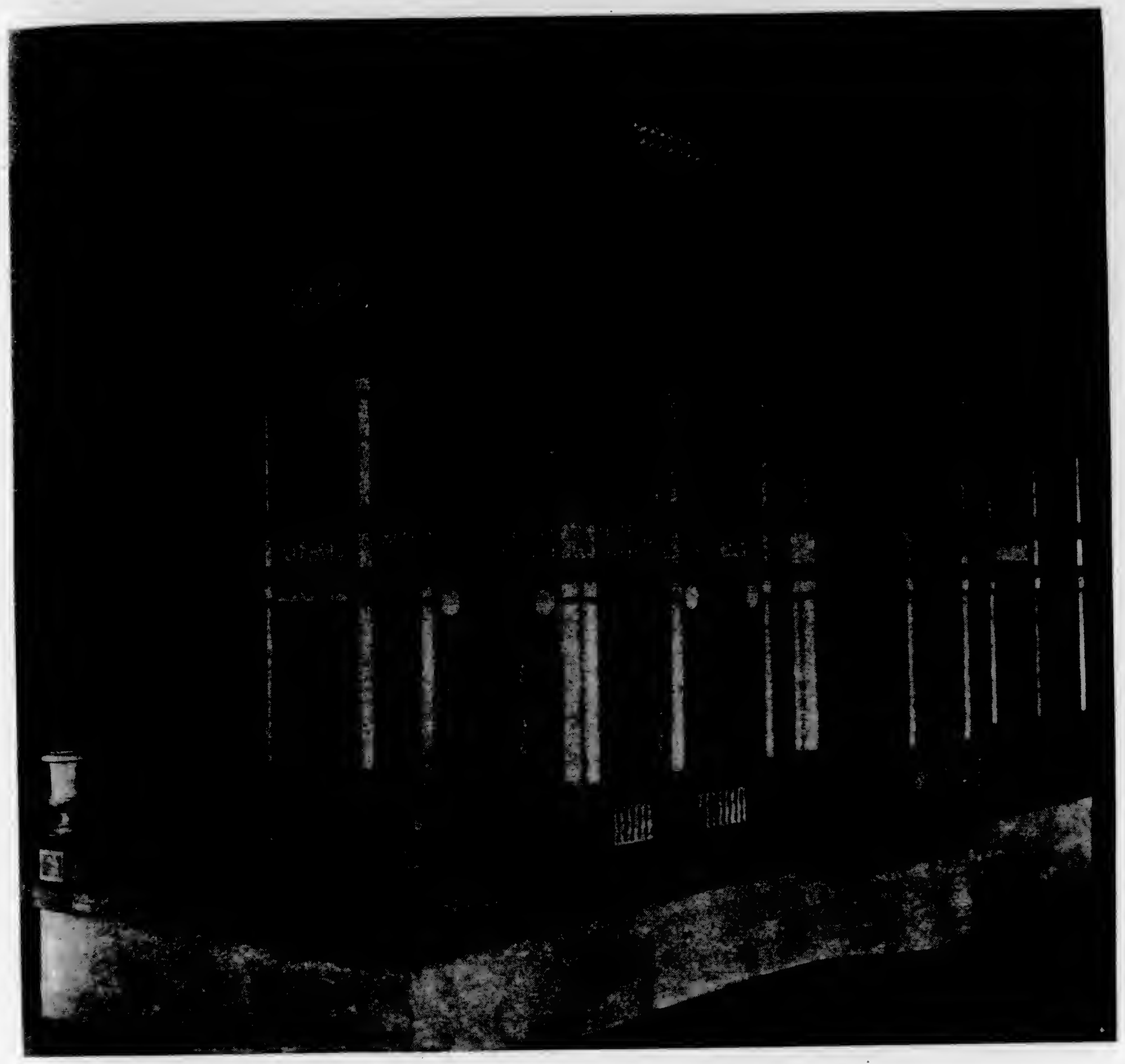

Plate No. I.—Model of the Proposed Two Family $1,200 Concrete House

The Edison Concrete House

NEWSPAPERS and periodicals at home and abroad are devoting much space to the recent statement of Thos. W. Edison, the inventor, that he would build a concrete house in a few hours at a cost of one thousand dollars. Some editors have taken the New Jersey wizard's announcement seriously while others have been poking all sorts of fun at it and London Punch has gone so far as to make the sarcastic suggestion that the cement tap be colored red so that it be not confused with the water tap. "Cement, however liquid," adds Punch, "is not a good thing to water the garden with, or to boil the potatoes in."

In a recent issue of Cement Age some space is devoted to a discussion of Mr. Edison's system by Edward S. Larned and Percy H. Wilson, civil engineers of prominence in the East.

According to Mr. Wilson's conclusions Mr. Edison seems to have conclusively proved, (1) that a house can be built in the way he states; (2) that every practical construction problem involved can be solved; (3) that a mixture of concrete can be obtained which will insure its flowing to all parts of the forms thus avoiding voids.

His experiments have not gone far enough as yet to definitely determine the following:

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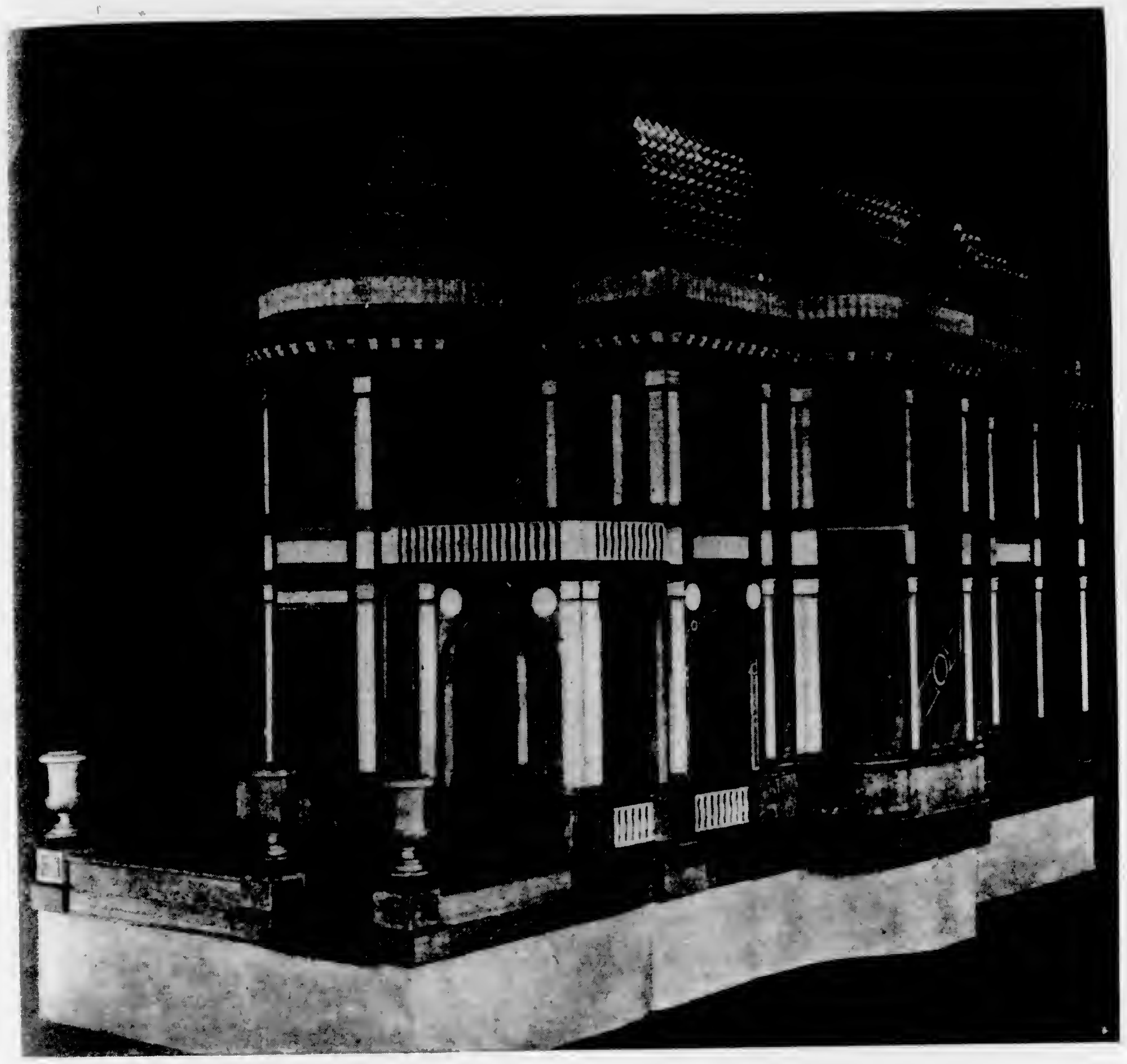

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First: Does the addition of the necessary colliod delay the setting of the concrete, or affect its strength?

Second: Will the stone separate from the sand and cement and form a non-uniform mass either in placing, or at a later period, due to the action of the laws of gravity?

The first of these items very naturally affects only the cost of the building. The second affects its stability and must be solved definitely before the building of a house in this way can be successfully accomplished.

Mr. Wilson concludes as follows: "On the whole the idea is one of rather revolutionary type in engineering construction, but judging from what Mr. Edison has already accomplished toward the solving of the practical difficulties which have arisen, it is likely that he will in the end be successful in building a house in the way he has planned."

Engineer Larned gives the following conclusions concerning the practicability of the project and the purpose of the inventor:

Mr. Edison states that his idea of a cheap concrete house is primarily intended for families living in the congested tenement districts of the large cities, who find at present a minimum rental of $9 per month for two or three small rooms with poor light, poor air, poor sanitation, accompanied with appalling fire risks and generally unattractive and demoralizing surroundings.

In order that the cost of living should not be enhanced, it is necessary, in taking these families into the suburbs or country districts, to fix the rental sufficiently low so that the difference between the present rates and the proposed rate will cover the cost of trolley transportation to and from the city or place of employment.

Mr. Edison estimates the cost of the proposed house at $1200, including plumbing, heating and lighting fixtures. The house is intended for two families, and the rental required on a 5 per cent investment basis would be sufficient under the present conditions to more than cover the expense of transportation of the head of the household.

The photograph published herewith, Plate No. 1, by courtesy of Cement Age, shows the proposed house. It suggests a building more attractive in appearance than usually occupied by families for whom it is intended, and while Mr. Edison recognizes that moulds for a less ornate building could be produced for much less money, he holds that the small additional expense representing not over an annual interest charge of $40 in the cost of the forms, is more than justified by the improved appearance and the general satisfaction of the occupant and community at large.

It may be suggested, however, that the design seems poorly adapted to concrete construction, owing to the irregularity of outline and amount of detail attempted. This is a matter of judgment and taste, and, of course, could be modified at will.

The proposed size of the building is 21 feet by 49 feet and 35 feet high, not including the cellar. The walls will be 12 inches thick reducing to 8 inches on the second story, and it is proposed to make the roof 6 inches thick. The floors and all partitions will be uniformly 4 inches thick.

Mr. Edison's idea is to construct these buildings upon sandy or gravelly areas, furnishing material for the concrete from the necessary excavations. The purpose of this, of course, is obvious in reduction of first cost, providing suitable materials can be found within the limits of the necessary excavation, but this limitation, if imposed, would seriously restrict the development of this class of buildings, for the reason that few areas adapted to cheap construction will be found furnishing satisfactory materials for concrete, or material in sufficient quantity for construction within the limits of the cellar excavation.

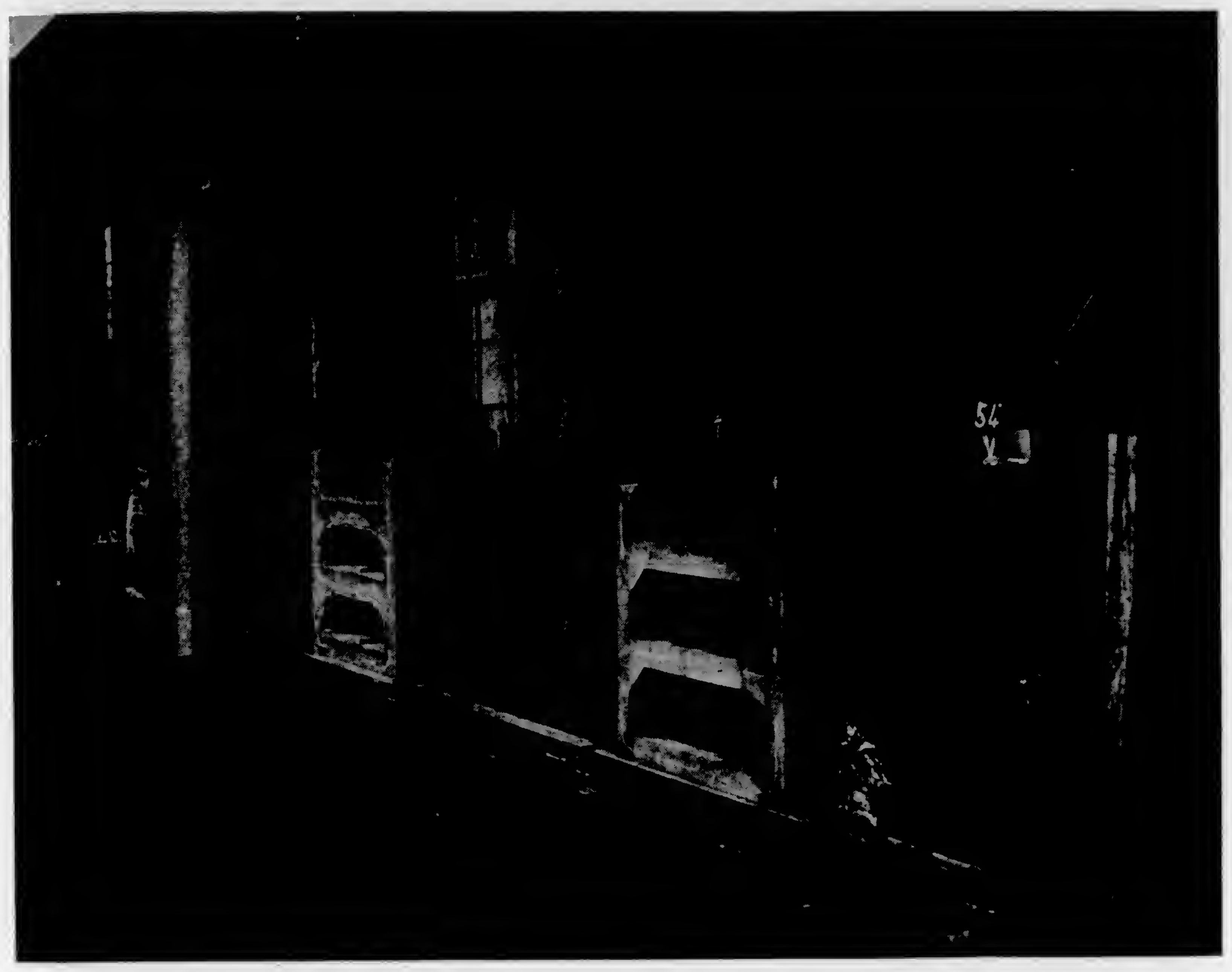

Plate No. II.—Experiments to Determine the Flow of Concrete in Wood Forms 4" Square in Cross Sections

The necessity of having good sand and good gravel at once suggests the difficulties experienced in most communities to obtain these materials of suitable quality and it is fair to presume that in the majority of instances the sand and gravel or crushed stone would have to be brought to the work from sources as nearby as possible.

The moulds will consist of cast iron plates, but as yet the detail of dimensions has not been definitely fixed. The exterior plates for the wall forms will probably be from ¾″ to ⅞″ in thickness; the interior plates ½″ in thickness; the underside of the floor moulds and roof moulds probably from ¾″ to ⅞″ thick, while the upper side will probably be ½″ thick. The moulds for interior partitions will probably be ½″ plates. All mould plates are to have milled edges and faces with flanged joints drilled for dowel pin and bolt connections.

The inside faces of the mould plates will be nickel-plated or faced with brass where intricate tracery and detail is attempted in the finish.

It is expected that two houses per month can be constructed from one set of forms, and in order to secure a reasonable variety in design it is proposed to have six sets of moulds, the approximate cost of the six sets being about $105,000, but if one set only be provided, the first cost would be $25,000.

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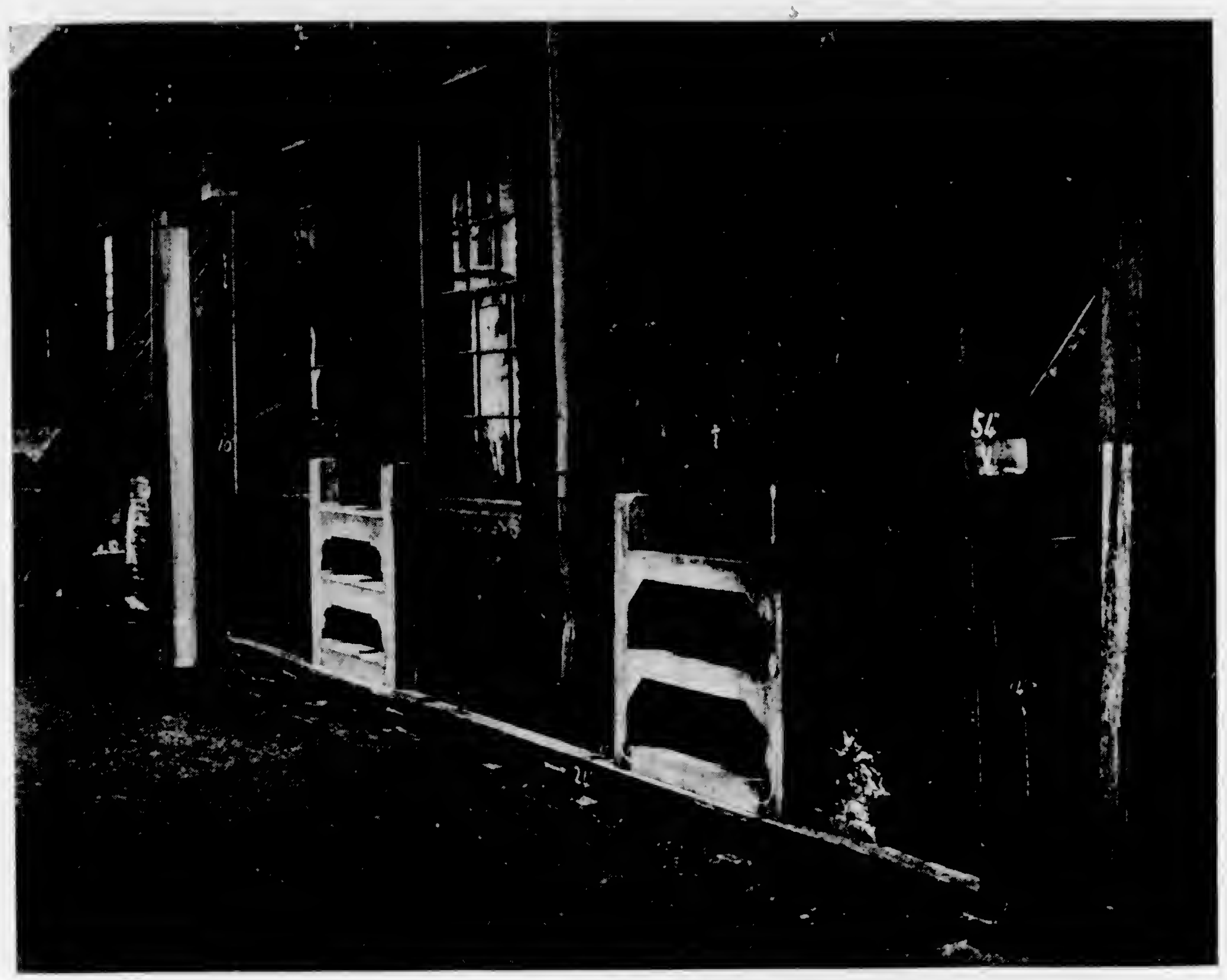

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In the use of cast iron for mould plates the probability of occasional breakage in handling must not be overlooked, and the question of time and cost of renewals is of the utmost importance.*

It would naturally be found advantageous to have the plates of as large surface area as possible, but this is limited by the use of cast iron, of the thickness proposed, and, again, the larger the sizes the greater the danger of breakage.

Mr. Edison proposes to erect and take down the forms by means of four small electrically driven derricks, and expects that it will take two days for erection and two days for removal.

Mr. Edison's preliminary estimate of the approximate weight of the moulds for one house is 280,000 pounds.

The reinforcement proposed for the floors and roof, and elsewhere where needed, will consist of ½″ and ⅝″ rods. It is not yet definitely determined whether they will be round rods or some system of deformed bars. It is proposed to place all of the reinforcement in position in advance of the concrete operations, and the rods will be held in their relative positions by wiring or spacers.

Pipes for gas, water and all plumbing, also ducts for electrical wiring, are set in position in the form in advance of concreting, and the flues for chimneys are formed by thin metal forms which are left in position.†

It is proposed to have a 100 H. P. boiler and engine on trucks furnishing the power to drive motors connected with the four small derricks, concrete mixers, elevator plant, which will also furnish any other power required.

It is also proposed to install three or four large mechanical mixers on the ground adjacent to the building. These mixers will be so arranged as to discharge into a storage hopper, from which the concrete is conveyed by bucket elevator to the distributing hopper at the top of the building, from which the material flows through pipes into the moulds. A specific gravity device is to be attached to the storage hopper, and the consistency of the mix carefully watched and kept uniform.

It is also proposed to use plungers, power driven, operating from the top in the moulds as the concrete rises, to keep same agitated, and prevent the segregation of materials, serving also to expel the confined air, and secure a perfectly uniform face, and also assist in forcing the flow of the material into and throughout the horizontal passages.

Mr. Edison claims that in his experiments he finds that concrete of the proposed consistency and composition expands in setting a very small fraction of an inch in the greatest diameter of the proposed house, and he believes that subsequent contraction and expansion in the walls can safely be neglected in the reinforcement introduced.

Mr. Edison proposes to use a mixture of 1 cement, 3 fine sand and 5 stone or gravel, passing the ½″ mesh sieve. He realizes that the serious problem involved is to prevent segregation of materials while being deposited and distributed, and claims to have solved this difficulty by the addition of colloids of some electrolyte in small quantity, which adds to the viscosity of the combined material, facilitates the uniform flow and prevents segregation. Mr. Edison also suggests that colors may be added to the mixture, if desired, but claims that he is experimenting with specially prepared paint for exterior application, and is seeking with some promise of success, a paint that will penetrate and mechanically combine with the

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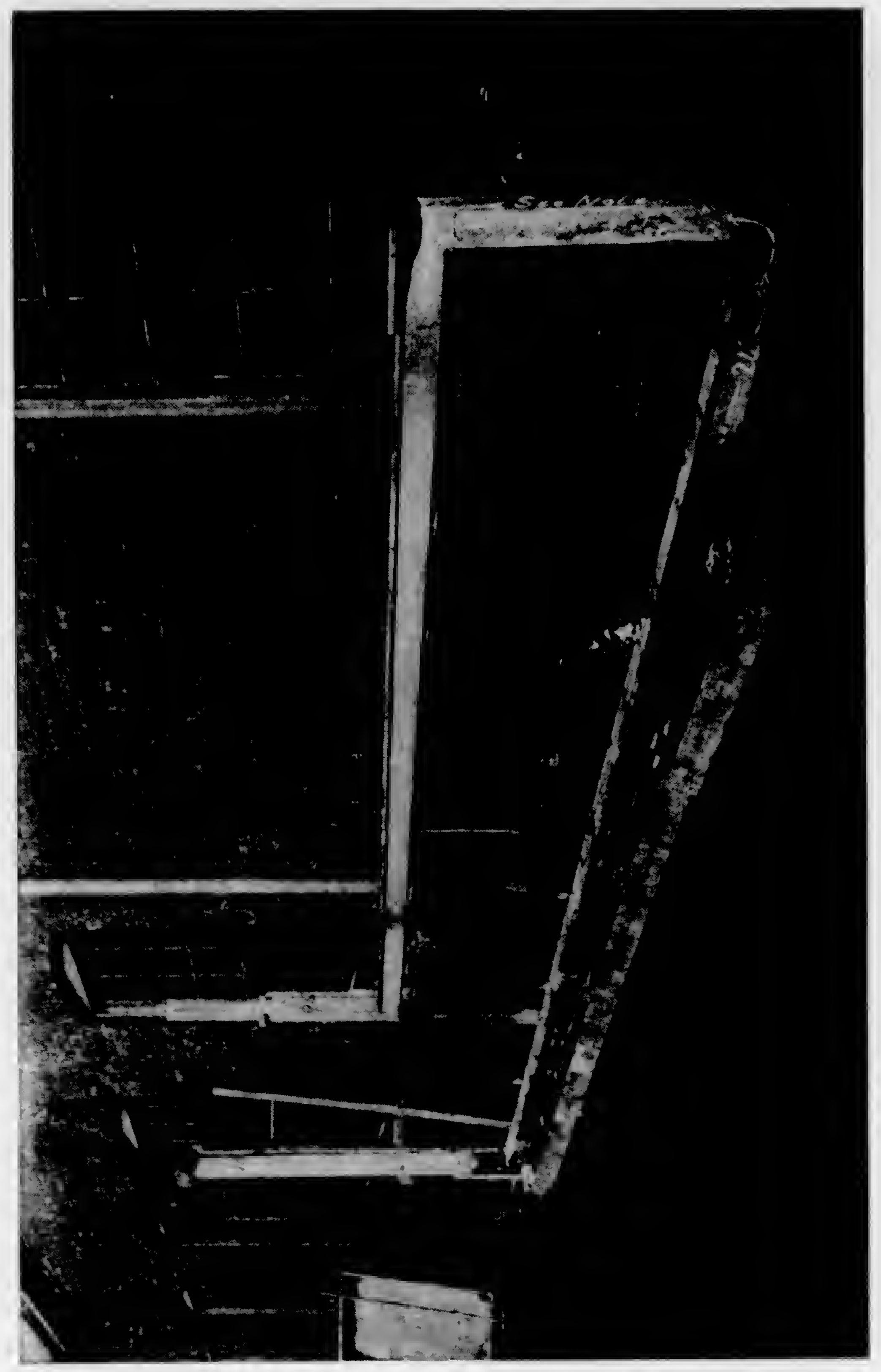
* Mr. Edison states that this has been allowed for at 4 per cent depreciation.

† Mr. Edison states that he has decided to put the pipes outside of the walls in most cases like hotel and sanitary plumbing.



The Result of the Last Test Made by Thomas A. Edison to Determine the flow of Concrete in the Forms for His Proposed Concrete House.

A comparison of this illustration with that on page 51 will show that this test was much more severe than the previous one. It will be noted that the concrete in the upper right hand corner of the casting is imperfect. The reason for this was that shortly after the concrete had been poured, the plug at this point was pulled, with the result that part of the concrete ran out before the plug could be replaced. Except for this accident, the casting is practically perfect.

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Pipes for gas, water and all plumbing, also ducts for electrical wiring, are set in position in the form in advance of concreting, and the flues for chimneys are formed by thin metal forms which are left in position.†

It is proposed to have a 100 H. P. boiler and engine on trucks furnishing the power to drive motors connected with the four small derricks, concrete mixers, elevator plant, which will also furnish any other power required.

It is also proposed to install three or four large mechanical mixers on the ground adjacent to the building. These mixers will be so arranged as to discharge into a storage hopper, from which the concrete is conveyed by bucket elevator to the distributing hopper at the top of the building, from which the material flows through pipes into the moulds. A specific gravity device is to be attached to the storage hopper, and the consistency of the mix carefully watched and kept uniform.

It is also proposed to use plungers, power driven, operating from the top in the moulds as the concrete rises, to keep same agitated, and prevent the segregation of materials, serving also to expel the confined air, and secure a perfectly uniform face, and also assist in forcing the flow of the material into and throughout the horizontal passages.

Mr. Edison claims that in his experiments he finds that concrete of the proposed consistency and composition expands in setting a very small fraction of an inch in the greatest diameter of the proposed house, and he believes that subsequent contraction and expansion in the walls can safely be neglected in the reinforcement introduced.

Mr. Edison proposes to use a mixture of 1 cement, 3 fine sand and 5 stone or gravel, passing the 1½″ mesh sieve. He realizes that the serious problem involved is to prevent segregation of materials while being deposited and distributed, and claims to have solved this difficulty by the addition of colloids of some electrolyte in small quantity, which adds to the viscosity of the combined material, facilitates the uniform flow and prevents segregation. Mr. Edison also suggests that colors may be added to the mixture, if desired, but claims that he is experimenting with specially prepared paint for exterior application, and is seeking with some promise of success, a paint that will penetrate and mechanically combine with the

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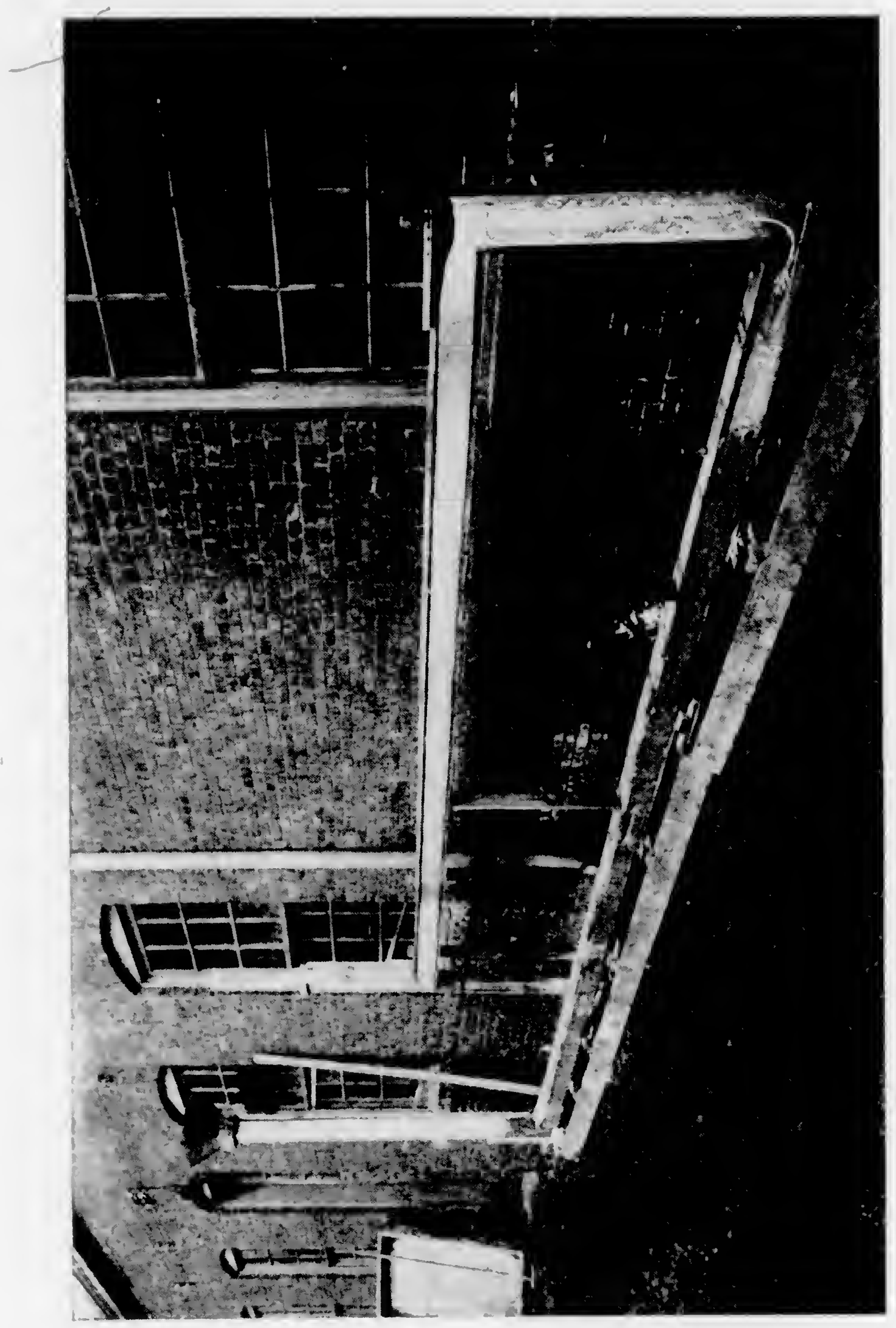
[*] Mr. Edison states that this has been allowed for at 4 per cent depreciation.

[†] Mr. Edison states that he has decided to put the pipes outside of the walls in most cases for hotel and sanitary plumbing.



The Result of the Last Test Made by Thomas A. Edison to Determine the flow of Concrete in the Forms for His Proposed Concrete House.

A comparison of this illustration with that on page 51 will show that this test was much more severe than the previous one. It will be noted that the concrete in the upper right hand corner of the casting is imperfect. The reason for this was that shortly after the concrete had been poured, the plug at this point was pulled, with the result that part of the concrete ran out before the plug could be replaced. Except for this accident, the casting is practically perfect.

concrete. This treatment, however, is expected to be a considerable item of expense, using a preparation of bismuth or cobalt, and experiments are now being made in the use of barrum. The use of colors or the cost of painting with such preparation as Mr. Edison may develop has been omitted in his preliminary estimate of $1200.

This preliminary step is attended with only one detail of special interest, and that is in the exact levelling of the top of the 12-inch monolithic cellar walls to receive the wall moulds.

At the West Orange laboratories a few experiments have been made to determine the flow of concrete and the illustration herein reproduced, plate No. 2, indicates the method pursued.

The first experiment represented by the two figures in the center of the picture consists of 4-inch board moulds, set vertically with two horizontal connecting ribs of the same size. The concrete in each case was poured into the top of the vertical member and flowed by gravity alone into the horizontal moulds and up the opposite vertical moulds, apparently filling same perfectly, and without any appearance on the exterior of the segregation of materials.

The last and most important test consisted of two upright members 10 feet in height, each 4 inches square in cross section, connected at the base by a horizontal form of the same dimensions.

As one looks at the picture, the concrete was poured into the hopper of the left hand vertical mould by means of buckets intermittently emptied. The forms were not jarred during the flow of the material and as indicated in the right hand vertical form, the concrete succeeded in rising 54 inches above the base.

The whole idea of Mr. Edison's proposition is based upon the flow of liquids. Concrete, of whatever composition, can at least only be called a semi-liquid, and if the medium be sufficiently fluid to insure its flow under gravity alone, it would be, under natural conditions, impossible to maintain the aggregates in equilibrium or suspension.

This condition is also materially affected by the size of the aggregates used, and the rate of flow is likewise affected by the same elements.

There would seem to be no particular difficulty in filling the vertical moulds with reasonable certainty by pouring the concrete from the top of the building, but the flow of this material through the horizontal floor forms, impeded by the necessary reinforcement, held in position by wiring or spacers, with occasional splices, and perhaps crossings, is the doubtful problem, and unless segregation of materials be prevented, and the horizontal moulds completely filled before the initial set of the cement, it would be natural to expect irregular and incomplete results.

Mr. Edison proposes to facilitate the flow of the material and assist in the prevention of segregation by the introduction of a colloid, which may be clay in a very fine state of division, an electrolyte, or possibly hydrated silica, any one of which will serve to reduce the mixture to a more or less gelatinous condition, and by the viscosity attained hold the aggregates in equilibrium or suspension.

The addition of a colloid is also expected to render the concrete impermeable and make unnecessary any other waterproof treatment. Mr. Edison also believes that because of the low conductivity of concrete, no difficulty will be experienced from condensation of the inside of the walls, and it is proposed to leave the inside surfaces produced by the mould plates without further treatment, unless tinting be desired for purposes of decoration. It is also interesting to note that no joints will be provided to take up contraction and expansion.

The use of plungers, power driven, to keep the concrete agitated and assist in its flow, is a very novel feature, and results will be observed with much interest. It would seem that plungers large enough to be effective would subject the moulds to considerable strain, and if the effect is violent enough to cause quick or unusual motion in the concrete, it suggests the possibility of the displacement of reinforcement, unless same be very rigidly fixed in position.

In connection with the proposition to raise the concrete to the top of the building, by means of a bucket elevator, a computation reveals the following interesting facts, viz., if the buckets be of ½ cubic foot capacity each, they must discharge at the rate of 18 buckets per minute to handle 200 cubic yards in ten hours. If of ¼ cubic foot capacity each, they must discharge at the rate of 36 buckets per minute. In either case, this means a belt of chain speed of from 1-3 to ½ more in each case, and the loading of the buckets by continuous discharge from the hopper suggests the possible waste of some material and the fouling of the chain or belts to an extent that would probably cause some trouble. It would be impractical to load the buckets full of such fluid material owing to waste.

Mr. Edison has, undoubtedly, taken a bold step in the right direction, and the new ideas that are set in motion by his experiments will doubtless evolve a scheme by which the cost of the forms will be materially reduced, and the time required for construction greatly shortened.

* * *

Thomas Edison and "Mr. Punch"

THE London "Punch," Great Britain's acknowledged master of the revels, takes a jocular view of Mr. Edison's plan to pour concrete houses while the prospective tenant waits in front with his household goods, ready to move in as soon as the cement stops running. "Mr. Punch" says:

"Mr. Edison's announcement, while paralyzing the building trades, has stimulated activity in other quarters:

"The more extravagant party in the London County Council talk of laying liquid-cement mains in suburban London. It would be a great boon, they argue, to the ratepayer to be able to turn on the cement, just as nowadays he turns on the water for the garden hose. If unexpected guests come, for whom there is no room in the house, if a fowl-house or dog kennel should be required, if the householder has ambitions towards a billiard room, if a porch or conservatory, or even a summer house, should need to be built, if the roof begins to leak in a storm, or (as in some cases it has done) become restless, if the garden wall must be raised to keep next-door from staring—in fifty different emergencies a ratepayer would find an ever-ready supply of liquid cement most useful. All he would have to do would be to send down to the local ironmonger for the moulds, stick them up, and then leave the tap running into them, with perhaps the youngest boy to keep an eye on it.

"We would like to suggest that the cement tap ought to be colored red, so that it be not confused with the water tap. Cement, however liquid, is not a good thing to water the garden with, or to boil the potatoes in."

* * *

The cross of today would be far more light if it were not burdened with yesterday's errors and regret.

The California Gravel Roof

By J. R. D. MACKENZIE*

THE gravel roof of the Pacific Coast is somewhat different from the gravel roof used in the Eastern States and Europe, due to the fact that the gas plants of this territory use oil instead of coal in making gas, and consequently there is no residue in the shape of coal tar with which to saturate felt and refine into coal-tar roofing pitch.

The roofing felt manufacturers of San Francisco and Los Angeles saturate with an asphalt from which the lighter oils have been extracted; and this same asphalt, when refined down to the consistency of pitch, is used in place of the coal-tar pitch of the East in the making of felt and gravel roofs.

Many architects, with previous Eastern experience, specify the use of coal-tar pitch and tarred felt for roofs in California, but on account of the prohibitive freight rates, these materials have not as yet been imported here for roofing purposes and consequently are never used.

California "D" grade roofing asphalt differs in one essential from coal-tar pitch, in that it oxidizes somewhat quicker, but this objection can be successfully overcome by "flooding" the gravel coat of asphalt as thickly as possible, instead of spreading it out thin. On the better class of buildings it is advisable to apply two flood gravel coats, which makes a coating equal to a flood of hard coal-tar pitch spread with a dipper.

A good deal of misunderstanding exists among architects in regard to the grades of gravel roofs best adapted to different types of buildings. Some architects specify a roof for a temporary frame structure that is only intended for use on fireproof structures of the first class—and vice versa. On certain cheap classes of buildings a roof with only three plys of felt would be perfectly proper and satisfactory; while in some cases an eight-ply roof would be necessary. Within the fire limits of most cities at least a five-ply roof must be laid, as it has been found by extensive experiments of fire departments and insurance underwriters that the greater the number of separate sheets or plys, the greater the fire-resistance—and, of course, water resistance also.

Asphalt saturated wool felt ranges in weight from eight to fifteen pounds to the square of 100 square feet, but it is impossible to make a good roof and use anything less than 12 pound felt. Outside of labor, felt is the most expensive ingredient of a gravel roof, and on account of the universal ignorance regarding the great difference in weights of this material, many roof contractors substitute lighter weight felt than specified or proper, as in this way a great saving can be effected in the cost of the roof without changing its appearance. This is a very common practice among irresponsible roofers and should be carefully guarded against by architects and engineers.

However, gravel roof specifications and inspections have been improving during the last few years, and the loopholes for improper, shoddy, work are gradually being closed as the architects are getting to better understand the nature of these materials and the many ways in which they can be used and misused.

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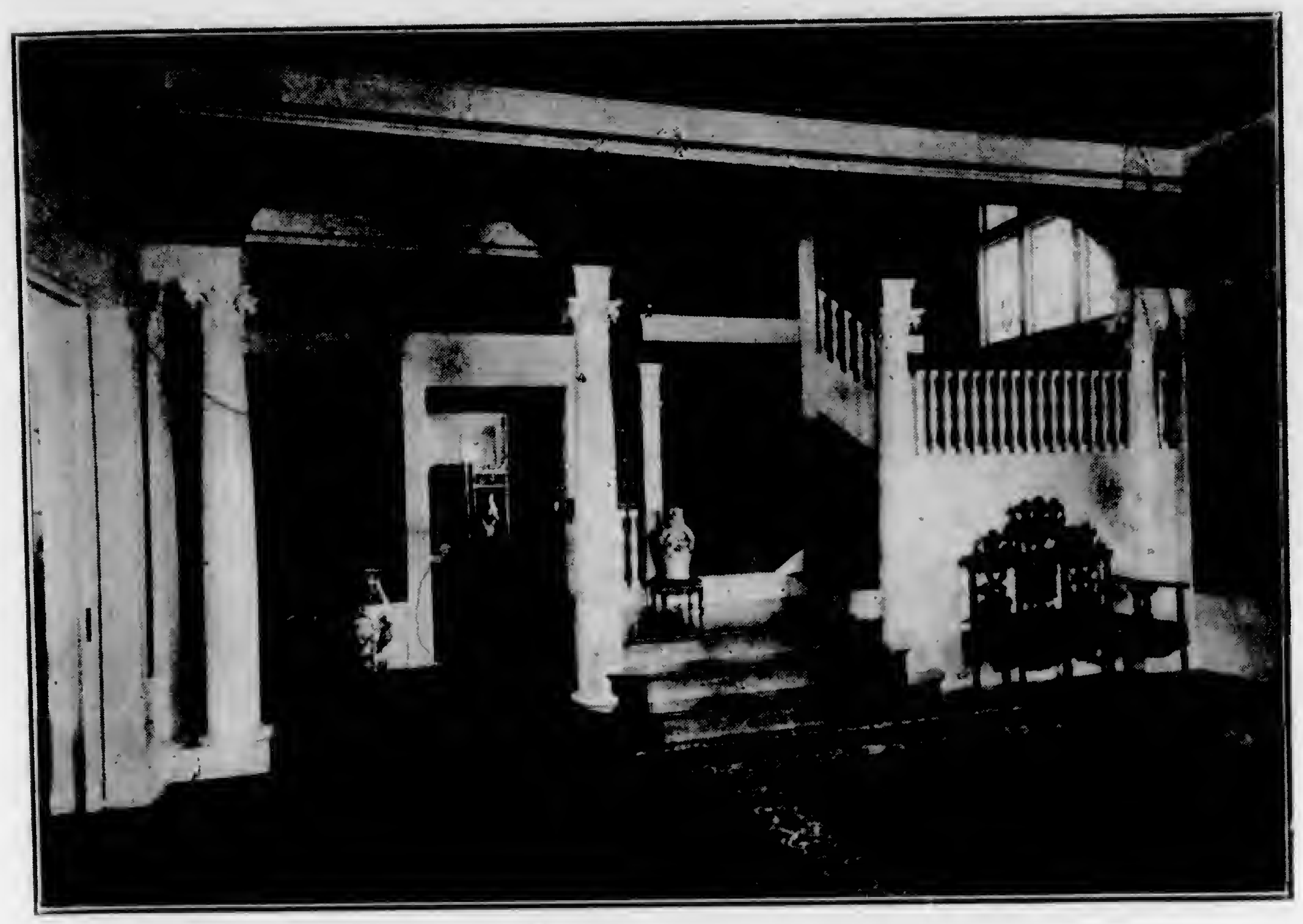
* Mr. Mackenzie is proprietor of the Mackenzie Roof Company with offices at 427 Fifteenth street, Oakland.



Entrance Hall to House of Mrs. T. V. Wright, Oakland
William Knowles, Architect

Making an Old House Modern

By WILLIAM KNOWLES, Architect

THE accompanying illustrations of a house in Oakland, Cal., show what can be done in transforming a seeming hopelessly ugly building into an ornate and really attractive abode. The meaningless lines of the house have been drawn into such shape that the surfaces have quite pleasing proportions. While the shadow lines have been brought out to please the eye, no effort has been made to follow any particular architectural precedent. The different surfaces are treated in a natural manner, giving the right values, so that the group instead of being made up thoughtlessly has a certain defined scheme that is convincing.

By stripping the exterior of the ugly outside window trims and caps and using in their stead a clean, refined moulding, a dignified effect is produced. The whole exterior being shingled relieves the house of the confusion shown by the old mill work. The impossible tower, meaningless in the old design, has been removed and the handling of the dormer windows in the bay window has given all the tower effect necessary and would seem to be in the right place. The view showing the hall illustrates what can be done by removing the old style stairway running straight to the front door with a narrow entrance hall. This old stairway was dispensed with entirely, the partition separating the hall from the old time parlor was taken down and the whole space thrown into a spacious stairway hall, the stairway being broken into landings, as shown in the photograph. The hall decorations, selected with careful attention to the detailing, made this change, though a simple one, strikingly effective. The owner of the house is Mrs. T. V. Wright.

House of Mrs. T. V. Wright, Oakland. Before Improvements Were Made
William Knowles, Architect

Government Seeks Fireproof Material

Some Startling Results of Elaborate Tests

By RICHARD L. HUMPHREY, C. E.

THE conflagration at Chelsea, Mass., which rendered 10,000 persons homeless and resulted in a property loss of several million dollars, following, as it did, closely upon the heels of the Boyertown, Pa., and Collinwood, Ohio, holocausts, with their terrible loss of life, has added much significance to the fire tests of building materials that have been conducted recently by the United States geological survey in behalf of the government.

The federal government, owner of buildings valued at more than $500,000,000 and spending $20,000,000 every year for new structures throughout the country, conducted these tests in order that its architects and engineers may have definite information concerning the fire resisting qualities of the different materials of construction to the end that the government's buildings may be properly safeguarded from fire within and without.

Engineers have long contended that with present methods of construction a conflagration resulting in the destruction of millions of dollars' worth of property and the sacrifice of human life is possible in every

House of Mrs. T. V. Wright, Oakland. After Improvements Were Made
William Knowles, Architect

city of any size in the country. Their position has been proved in a tragic manner by the Baltimore fire, the fire following the earthquake in San Francisco and that in Chelsea in April.

It is the belief of the engineers that these fires are unnecessary and can be prevented by the erection of proper fireproof buildings. The government does not insure its buildings against loss by fire, but bends its energies toward making the structures fireproof. A small fraction of what would be paid to insurance companies in premiums is being spent in finding out the materials that are best adapted to resist fire.

The first of a series of elaborate tests have just been completed by the structural materials laboratories of the geological survey, under the direction of the writer, engineer in charge. The tests were conducted at the Fire Underwriters' laboratories in Chicago and were made possible by the co-operation of the National Board of Fire Underwriters and the National Fire Protection Association.

Thirty panels of various building materials, including concrete building blocks; common, hydraulic pressed and sand lime brick; concrete of gravel, cinder, limestone and granite; glazed building and partition terra cotta tile; sandstone, granite and marble building stone, were tested. The materials were subjected to the direct application of heat for two hours and were then immediately quenched with water. An effort was made to obtain a maximum temperature of 1700 degrees Fahrenheit within half an hour after starting the tests and to maintain this temperature as nearly as possible constant through the succeeding half hours.

The building materials were placed in a sliding panel, which, when arranged for the fire tests, formed one side of the furnace. In the furnace gas flames were forced by a blast of air against one side of the panel.

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The building materials were placed in a sliding panel, which, when arranged for the fire tests, formed one side of the furnace. In the furnace gas flames were forced by a blast of air against one side of the panel.

After two hours the panel was brought from the furnace and the water turned on from a hose with a pressure of 50 pounds to the square inch.

The conditions under which these tests were made were unusually severe, and as none of the materials passed perfectly it proved a good test for comparative purposes. The temperatures used would hardly be reached in an ordinary fire, but might be in a conflagration.

Director Smith makes the following interesting summary of the tests: "While not conclusive, being but the beginning of a general line of investigations, the tests have brought out a number of important facts. The brick panels probably withstood the tests better than any other materials. There were two lots of common brick tested—one was an unused, recently manufactured brick and the other a brick that had been in an engine foundation for some years. The latter seemed to withstand the test better.

"Fifty per cent of the new brick were split, while 60 to 70 per cent of the old bricks were not damaged. The bricks at the back of the panel were entirely unaffected. The hydraulic pressed brick stood the test better than any other material. No damage was apparent whatever after the firing and before the water was applied, and although a number of the bricks cracked 70 per cent of them were found to be sound after quenching.

"There was apparently little difference in the strength of the bricks before and after firing. The natural building stones behaved worst of all the material tested. The almost complete destruction of these stones precludes any comparison between them. The sandstone panel entirely collapsed soon after the test was started."

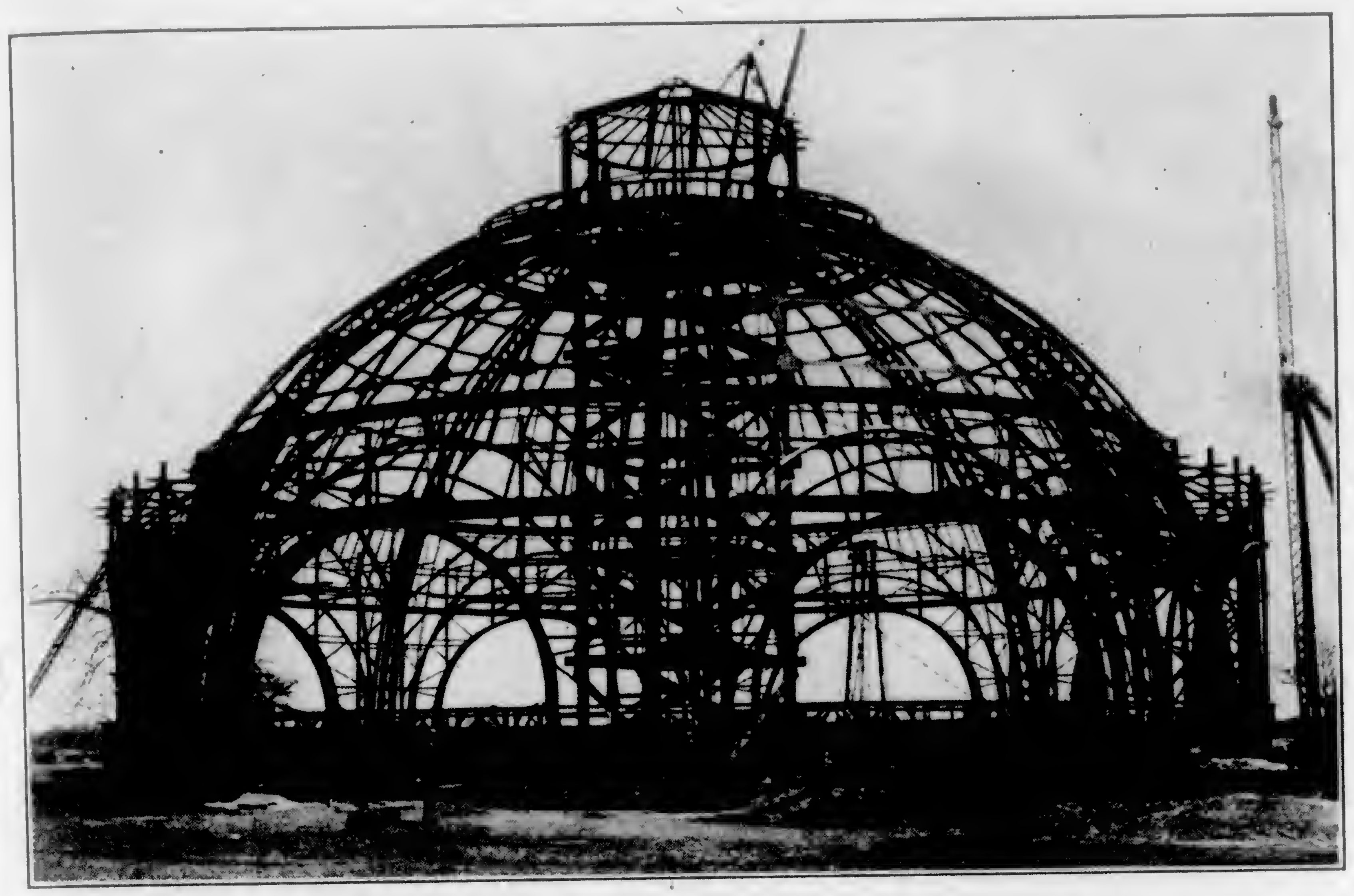
The testing engineers report that it was difficult to determine whether the concrete made of limestone, granite, gravel or cinders sustained the least damage. Their surfaces were all rather badly pitted by the fire and washed away by the stream of water. The test was unfair to cinder concrete, as the sample of cinder was poor, containing a large percentage of unburned coal, which ignited and left the surface of the concrete pitted. The granite concrete probably behaved the best.

The damage in no case extended far into the concrete, probably not more than one and one-half inches. The evidence shows that even at this depth, the temperature was comparatively low. The rapid heating of the face of the concrete, while the back remained cool, caused the concrete to crack vertically for some distance back from the face.

The cracking of the concrete can be avoided, it is believed, by using metal reinforcement, which would distribute the effect of the expansion. The tests also brought out most clearly the low rate at which the heat travels through concrete. This is one of the desirable qualities in materials intended for fireproofing purposes.

Linen tags which were placed in the hollow concrete blocks when they were molded were found to be undamaged after the fire test. In many instances the hollow blocks split after being subjected to the fire and water test. It was noticeable that the richer the mortars used in these blocks the less they were affected by the test. The mortars mixed with the greatest percentage of water gave the best results. The wetter, rich mixtures in these tests stood out apparently undamaged in contrast with the damaged faces of the leaner, dryer blocks.

It is apparent that one of the causes of weakness in the hollow cement building blocks is in the weakness of the concrete, due to a too dry and thin mixture, which, coupled with the thinness of the webs—the thin pieces connecting the walls of the blocks to give strength—provides insufficient strength to resist the rapid expansion of the face of the blocks under test. By making the webs thicker they can be made to stand the fire test satisfactorily.



Steel Dome of Emporium Building, San Francisco. Albert Pissis, Architect
Dome Built by Levering & Garrigues, New York. Woods & Huddart, Agents

Largest Steel Dome In United States

By FRED. T. HUDDART

ENGINEERS are manifesting considerable interest in the great steel dome which has just been erected in connection with the new Emporium building in San Francisco. It is said to be the largest steel dome in the United States, measuring 102 feet in diameter at its base, which is five feet more than the base of the great dome, heretofore pronounced the largest in the United States, of the Capitol building at Washington.

The main frame consists of eight heavy lattice girder ribs resting upon a circular girder at the base, and framing into a circular lattice girder at the top, which in turn supports the lantern. Two intermediate horizontal circular lattice girders are framed into the main ribs of the dome and serve to brace the same and carry the intermediate rafters which start at the level of the top of the large arched openings, of which there is one between each pair of ribs. The main frame of these arched openings, which are 25 feet 9 inches in diameter, is composed of a 15-inch I beam resting at the bottom upon the circular girder previously mentioned, and connected at the top to the lower of the intermediate horizontal circular girders bracing the ribs.

The work was fabricated from templates, and was erected complete at the bridge shop to insure its fitting properly when erected at the site, but it was found that the workmanship was so exact that no alterations were required. The total weight of the steel construction is about two hundred tons.

The general dimensions of this dome are as follows: Diameter, 102 feet 6 inches; height of dome proper, 51 feet 9 inches; height to top of lantern, 67 feet; diameter of lantern, 22 feet 6 inches.

Three-Hinge Reinforced Concrete Bridge, Santa Cruz. William M. Thomas, Engineer.

Novel Design of a Three-Hinge Reinforced Concrete Bridge

By WM. M. THOMAS, C. E.

BECAUSE of its novel design and the special features introduced in its construction, the following description of the three-hinge reinforced concrete cantilever arch bridge and retaining wall recently erected over the San Lorenzo river for the Union Traction Company, Santa Cruz, Cal., will, no doubt, be of interest and profit to those engaged in structural work.

The bridge, which marks an innovation in concrete bridge construction, crosses the San Lorenzo river at one of the most picturesque points of the city, and is on the line to Soquel, one of the several scenic extensions the company is making in several directions, to the rapidly developing suburban districts.

The San Lorenzo river at this point has an official river bed of three hundred feet and is skirted on either side by a beautiful growth of elders, willows and maple, with a deep undergrowth of wild berries and grapes. The setting, which is ideal for a concrete structure, is only marred by the antiquated and dilapidated bow-string arch bridge belonging to the city, which is within three feet of the up-stream side of the new concrete structure. The old bridge, thanks to the municipal authorities, has recently been condemned. It has a one hundred and fifty-foot span and is supported by three-foot cylinders which rest on capped piles.

Before the present design was adopted a concrete bridge of four sixty-foot spans was designed by the writer, but the City Council refused a franchise for its construction, because of the close proximity of the piers. Among the conditions imposed in its construction were the following: John Martin, the president of the company, insisted upon the spring line of the arch being one foot above high-water mark; the city required one pier in the center of the stream, opposite the center span of the municipal bridge, and that the other piers be placed five feet behind the cylinders of the old structure. In addition to these conditions, Manager S. W. Coleman required that a grade of not over three and one-half per cent be maintained on the approach to the bridge. This gave two unsymmetrical arches with spans of 83 feet 6 inches and two of 30 feet 6 inch spans respectively.

At the outset of the work the designer had estimated that 500 pounds compression for concrete and 15,000 pounds tension for steel was necessary. He also maintained that he could construct the concrete arch beams and place them in position as cheaply as the usual false work and forms can be built.

Upon presenting his designs to Manager Coleman, and later to the president of the company, Mr. John Martin, they were convinced of the practicability of the ideas, but as many of the principles were new and were radical departures from old-time construction, Mr. Samuel Starrow, consulting engineer, was called upon for an opinion as to the merits of the proposed structure. After due deliberation, Mr. Starrow, recognizing the many advantageous features, approved of the design. Then it was that the money was appropriated and the work begun.

The Abutments.—The abutments mark an innovation in arch construction and are a long span proposition. The designer maintains that he can build this arch, in localities where height can be had, in spans that have only been possible in steel cantilever and suspension spans. The abutment, in combination with reinforced concrete beams of this type, forms a three-hinge arch bridge. He believes spans inside of 1000 feet are not an improbability as the cantilever arm at the outside end of abutment, when the beams are dropped into position, becomes a portion of the arch and thrust when carried down to the ground and backed up by the heavy floor extending beneath the entire abutment.

Description of Foundation.—Investigation of the ground showed fifteen feet of gravel and forty-five feet of sand without any disclosure of bedrock. At the outset a wall was driven around the outside edge of the abutment sixteen feet below low water. This wall was composed of 6"x12"x12"x12" O. P., interlocked with dovetailed strips. Two feet below the water level half of these piles were cut squarely off at the top, each alternate pile being cut off five feet below low water. A row of 3"x12"—8 was then driven into the ground two feet away from the wall. On the inside of the large cofferdam the ground was excavated to a depth of four feet, while the ground outside the large cofferdam and between the walls the excavation was sunk to a depth of six feet. The walls of the cofferdam having been bolted together, round piling was driven twenty-six feet into the cofferdam, four feet on centers, and cut off two feet below low water mark. A reinforced concrete slab was then laid over the entire area circumscribed by the small sheet piling wall, and was elevated to the low water mark. This slab was surmounted by two piers built to form a thirty-foot arch, the front pier having a cantilever arm extending toward the river 13 feet 6 inches. Between these piers an arch was sprung and the piers built up longitudinally of reinforced concrete, forming ribs which were reinforced with cross walls and horizontal reinforced floors that form compartments in the abutments. These compartments were then filled with sand for weight. On the outside of the reinforced concrete, longitudinal ribs is a semi-circular skewback that forms a bridge seat for the reinforced concrete arch beams. Thus it is readily seen that the underside of the cantilever arm on the pier forms a segment of the large arch, the socket of which is shaped to join the arch in a long span.

In structures of greater dimensions, when the spans are two and three hundred feet in length, the designer would only concrete this cantilever arm out twenty or thirty feet, while the structural steel reinforcing should protrude with the semi-circular skewback the desired distance without placing any concrete around the structural steel until the arch beams are dropped into place. The forms should then be hung to the structural steel. The entire arch should be concreted from pier to pier, thus saving the cost of falsework and an uncertain curve through the possible settlement of the foundation of the falsework.

The main portion of the arch between the skewback of the bridge is of the three-hinged rib type and is braced with cross walls. The strains are of a positive nature. The ribs or beams composing the arch being made on the ground, were hoisted into place, thus saving the expense of tediously constructed falsework. The inventor maintains that these beams can be made and hoisted into place for less money than it takes to build the falsework required in constructing an arch of the same proportions. The sectional arch also has an advantage over the one-piece arch, in that it has a known flexibility that is necessary in localities where seismic disturbances are frequent and where foundations may be influenced by severe and prolonged seasons of rain. With the sectional arch the author is certain of every strain to which the structure may be subjected and claims that to build a reinforced concrete bridge without hinges is impracticable, since weaknesses are bound to develop, if from no other cause than that of expansion and contraction of the arches, which is greater than is generally realized. The inventor is now making a series of significant tests on the rise and fall of an arch during changing temperature. He has found that these 83 feet 6 inch arches move up and down with every change in the temperature, a variation of 25 degrees on the thermometer causing the arch to raise or lower 40 hundredths of an inch. It is easy to recognize, therefore, what effect 125 degrees would have on a large arch without hinges and with no flexibility. These arch beams are reinforced with 4-inch round rods in both the upper and lower sides of the arch beams. The upper and lower rods are rigidly connected with ¼"x2" flat bars. This reinforcing form is rigidly connected to a cylindrical plate of steel at the crown end of the beam, the plate having cogs or semi-spherical balls protruding to engage a similar plate in which cups are sunk to correspond with the dimensions and receive these semi-spherical protruberances.

At the reverse end of these beams are semi-circular half-inch plates that form portions of the hinges at the skewback on the piers. The retaining walls depend entirely on gravity for their stability. A trench was dug for the base of the retaining wall, one-half the height of the wall. The entire length was divided into 35-foot panels, a joint being left at these divisions for expansion and contraction, with a 16-inch base. The width of the trench was made of concrete 1:3:6, with as many large stones as could be crowded into the construction, making the concrete a one man rubble. Old car rails were put longitudinally, two feet six inches on centers, in this mass, which was leveled at the top. Twelve inches back of the front and rear sides of this platform eight-inch longitudinal walls were run up to an elevation of four feet, with four cross walls in each 35-foot panel. These walls are reinforced longitudinally with old car rails every four feet of the height. After these walls were run four feet high, each panel was divided into three compartments with eight-inch intersecting walls. The inside forms were collapsed, the compartments filled with sand for weight and strength and a floor of sand and concrete put over the entire mass. A reinforcing of ordinary poultry netting was put on the floor, which acted as a horizontal beam, taking the thrust of the entire fill. After this floor was laid the wall was stepped back on the inside and the area was divided as below and the same procedure repeated. The remarkable thing about this style of retaining wall is an eight-inch compartment wall for any height of retaining wall. Thus a very high wall has no more concrete in a given vertical height than a low wall, excepting that required for extra length of floors and partition walls. Trolley poles are all of concrete and of unique design, the eight-foot bracket arm also being of concrete.

The officers of the Union Traction Company are, John Martin, president; F. S. Fitzpatrick, secretary; S. W. Coleman, general manager, and Wm. M. Thomas constructing engineer. The structural steel work and forming of the structural steel was done under the supervision of L. F. Williams.

Standard Portland Cement,* manufactured at Davenport, Cal., was used throughout and it has demonstrated its possibility for beautiful ornamental as well as sound construction work.

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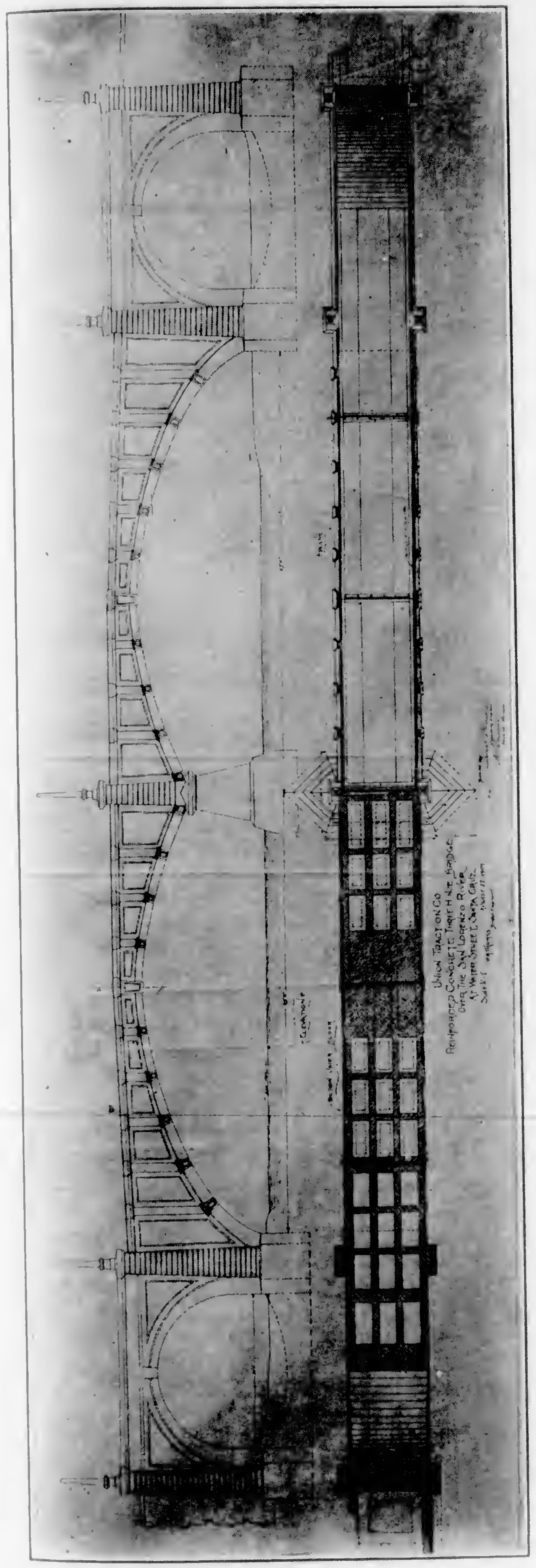
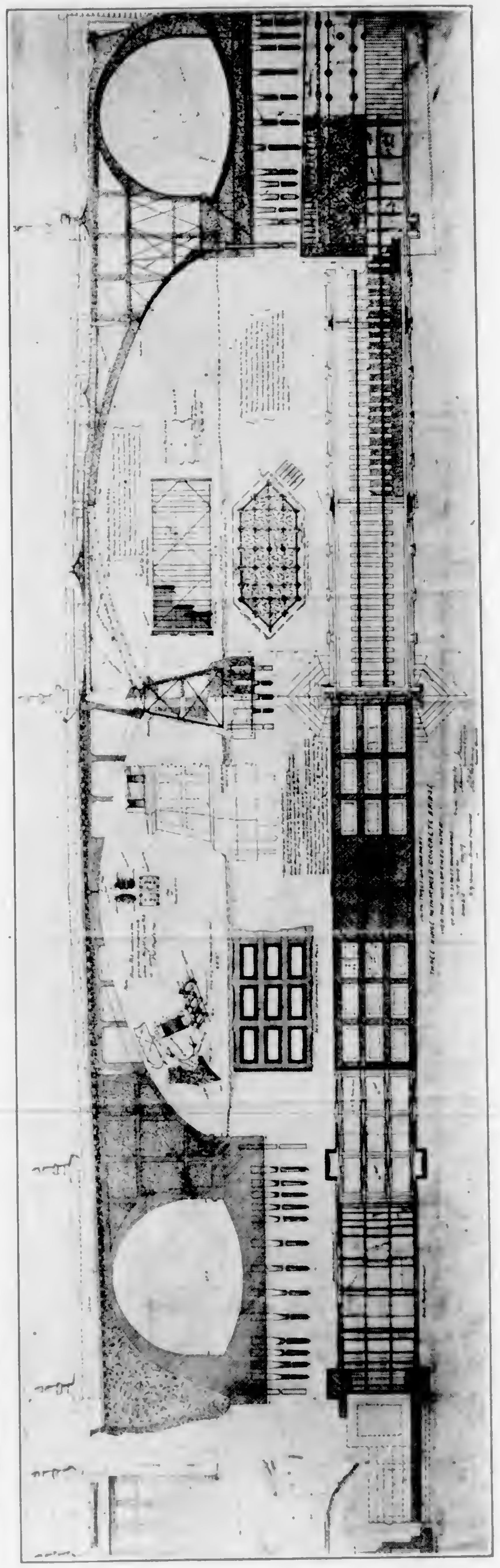
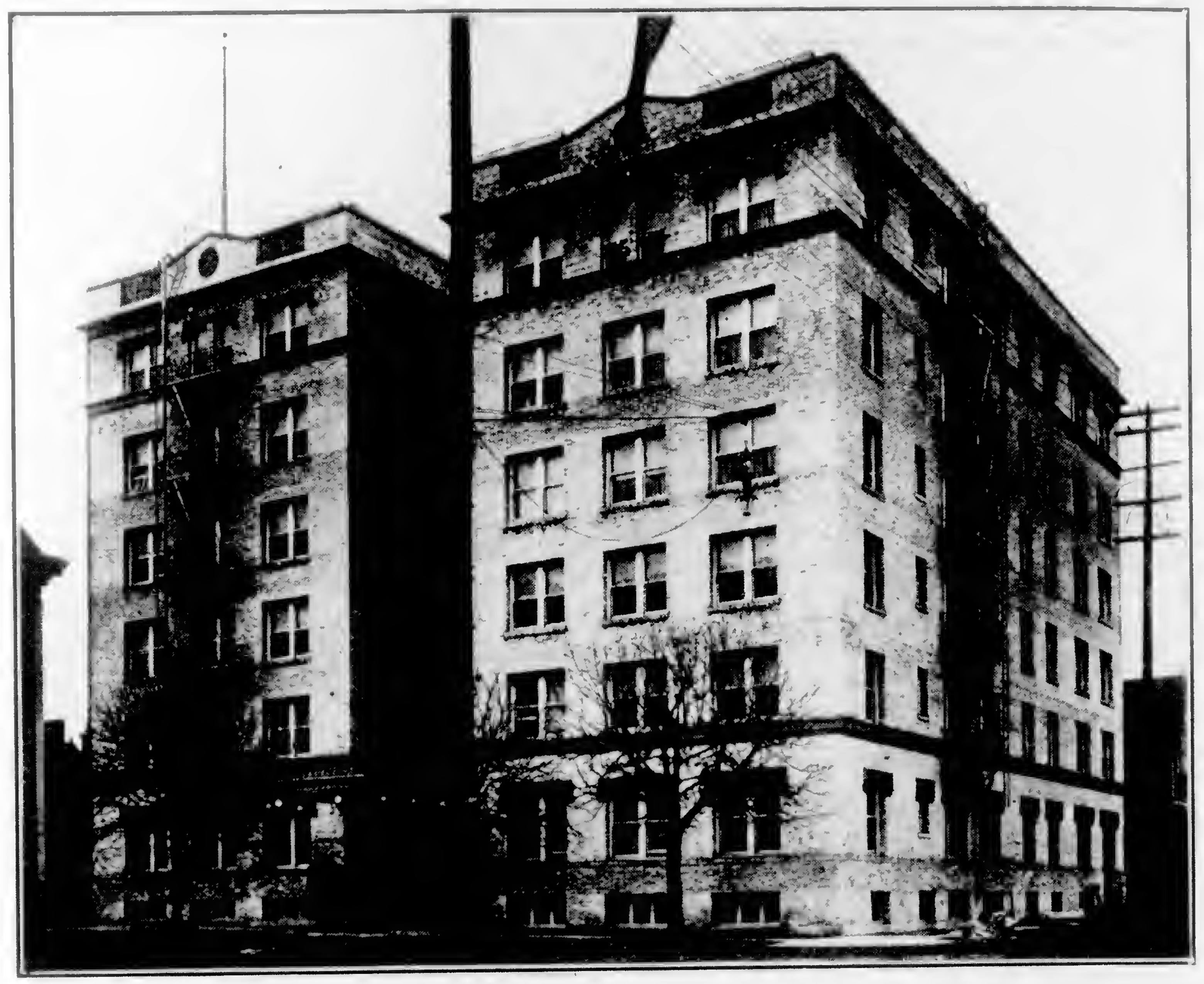
* Standard Portland Cement is handled in San Francisco by the Western Building Material Company, Halsey Building, 430 California street

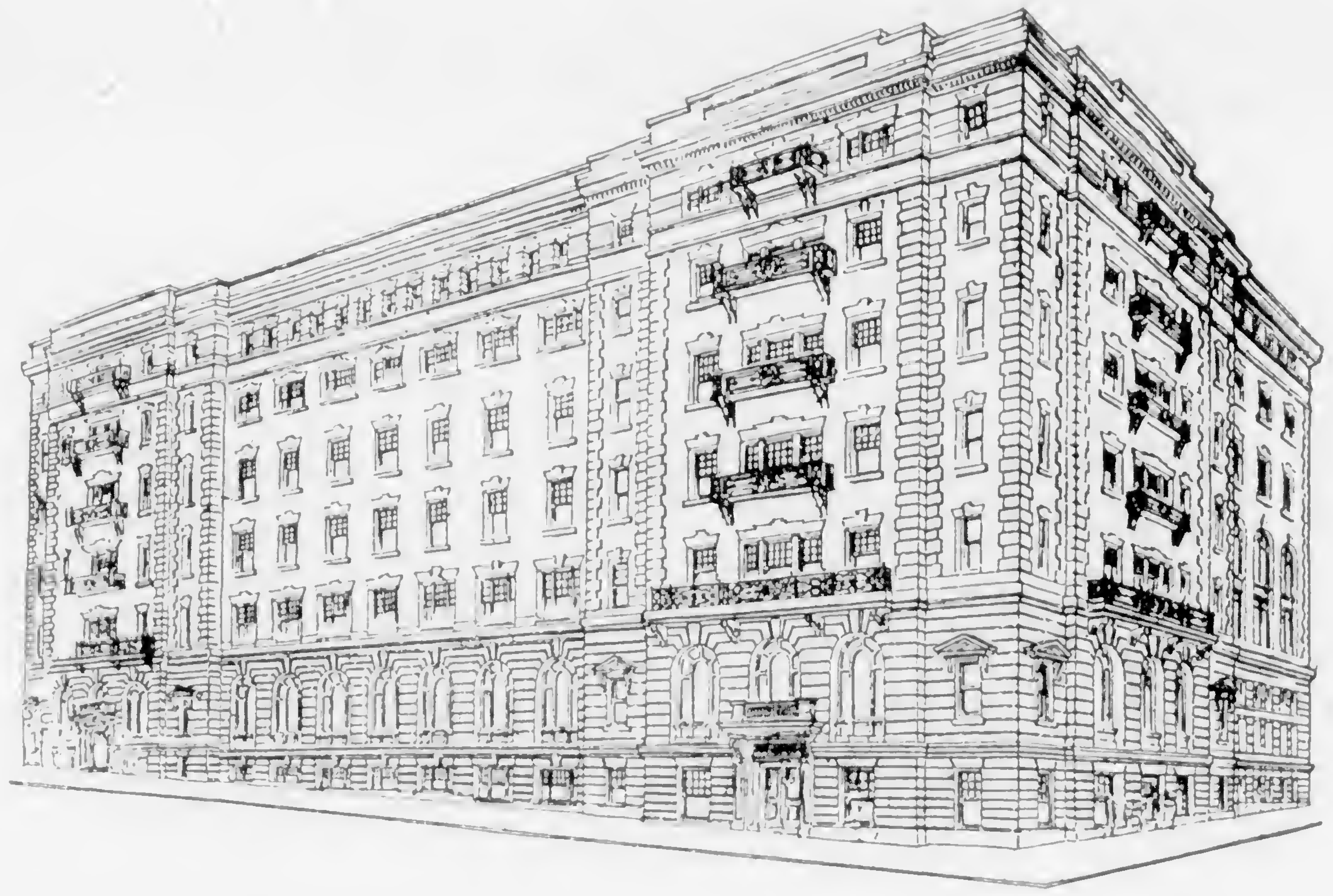




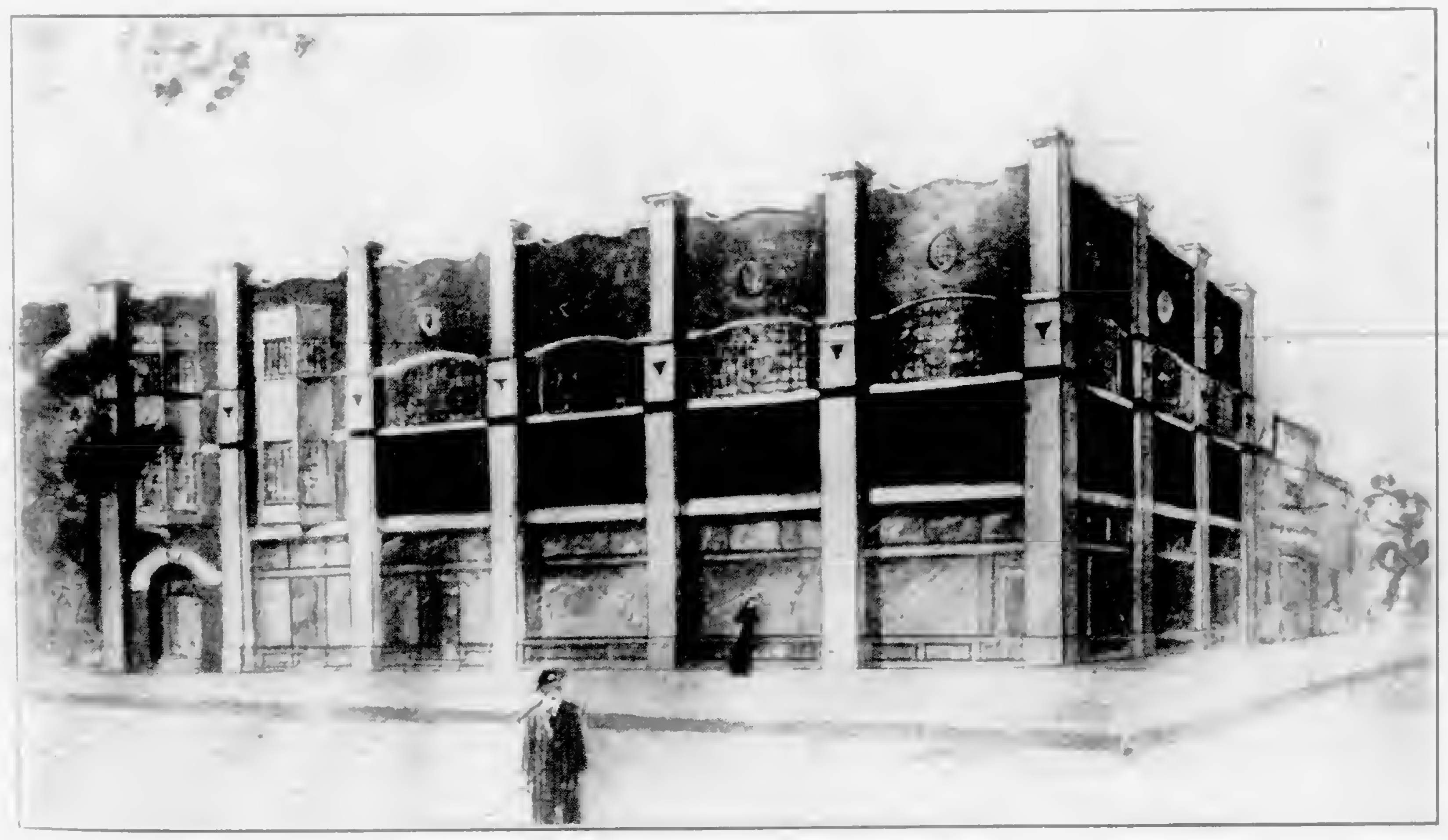


Nortonia Hotel, Portland, Oregon
Joseph Jacobberger, Architect

Interior Nortonia Hotel, Portland, Oregon
Joseph Jacobberger, Architect



Design for Portland Y. M. C. A. Building, Portland, Oregon
McNaughton, Raymond & Lawrence, Architects



Building for Orient Lodge, No. 17, I. O. O. F., Portland, Oregon
Francis J. Berndt, Architect

Nortonia Hotel, Portland, Oregon
Joseph Jacobberger, Architect

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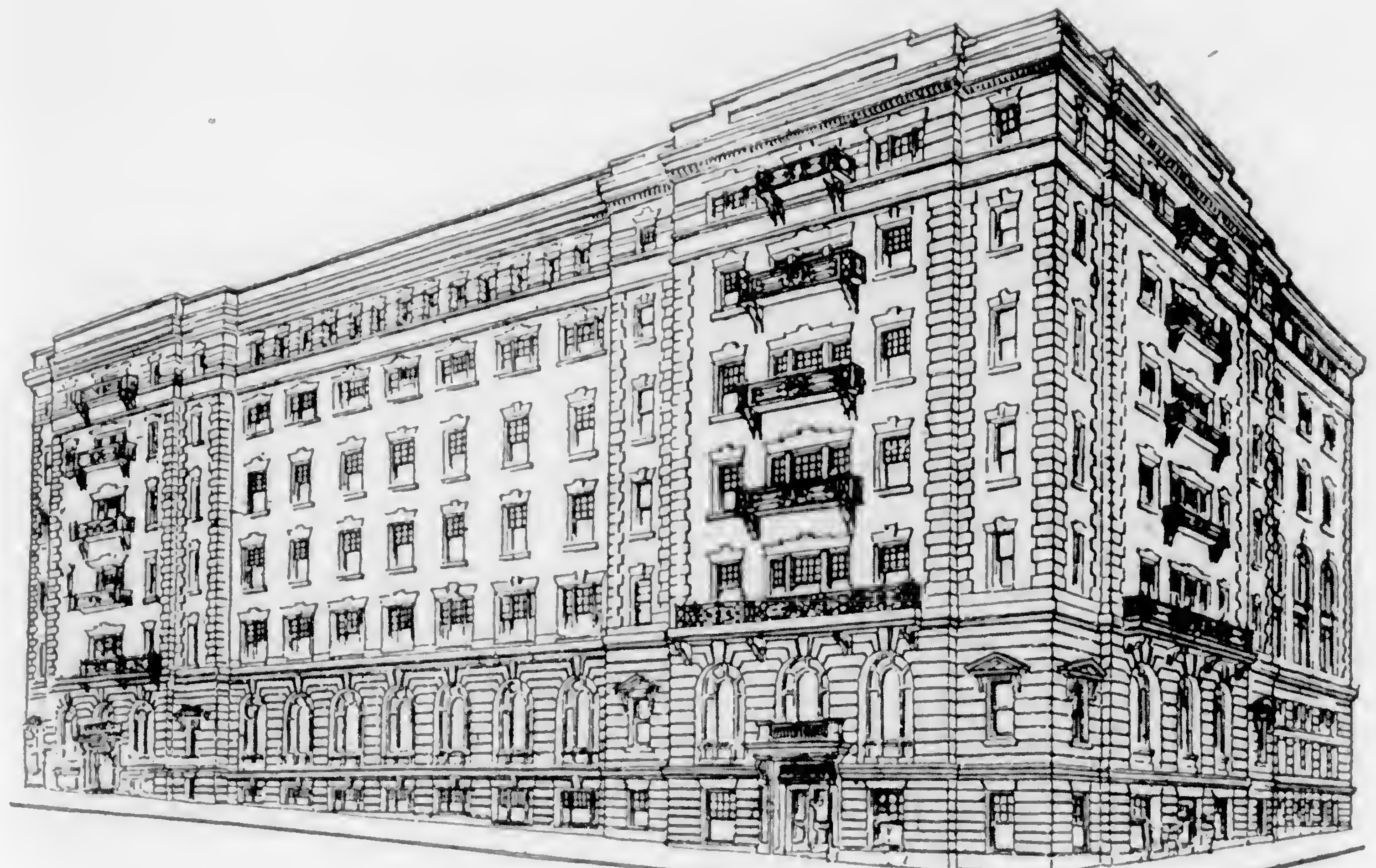

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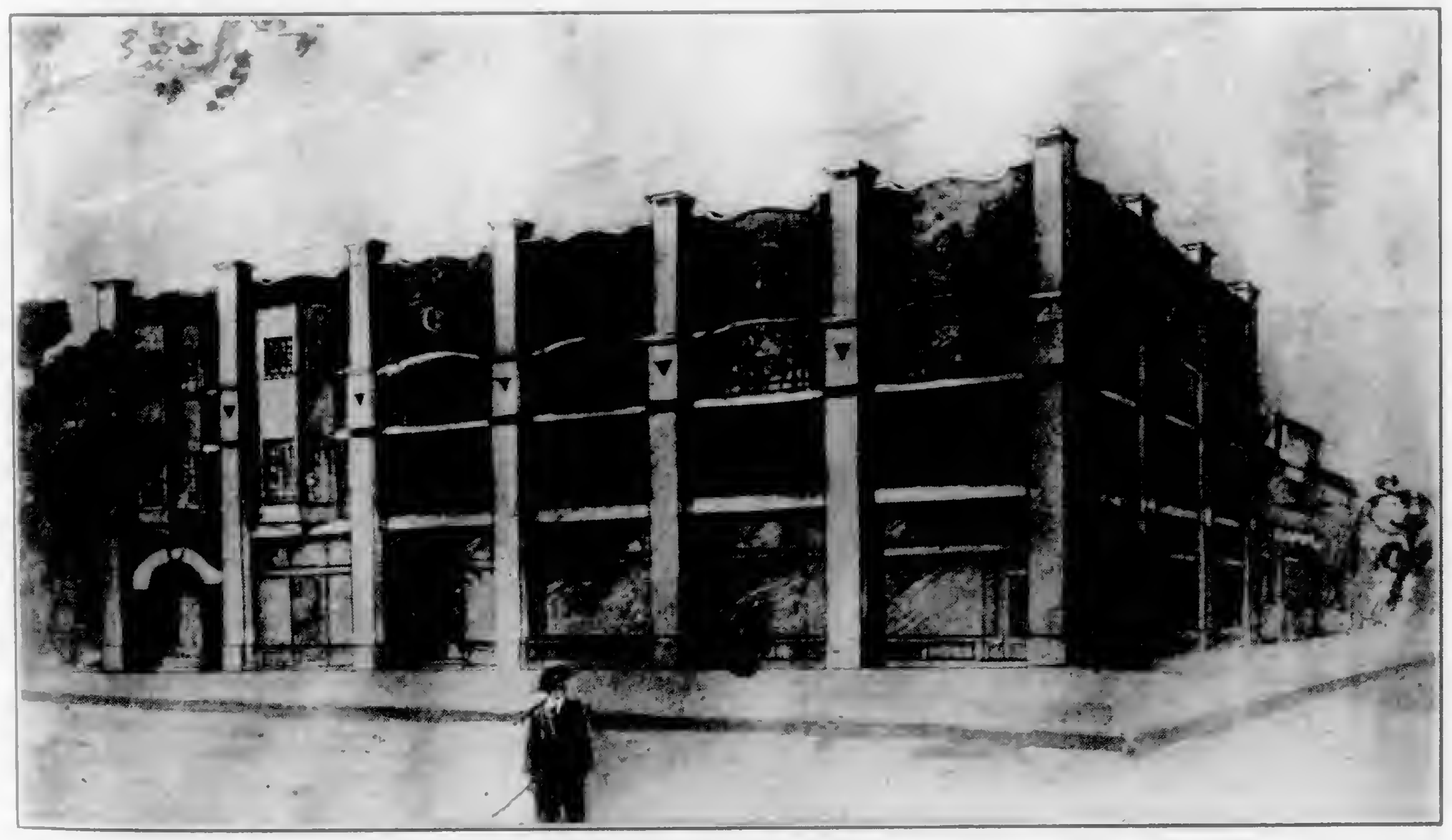

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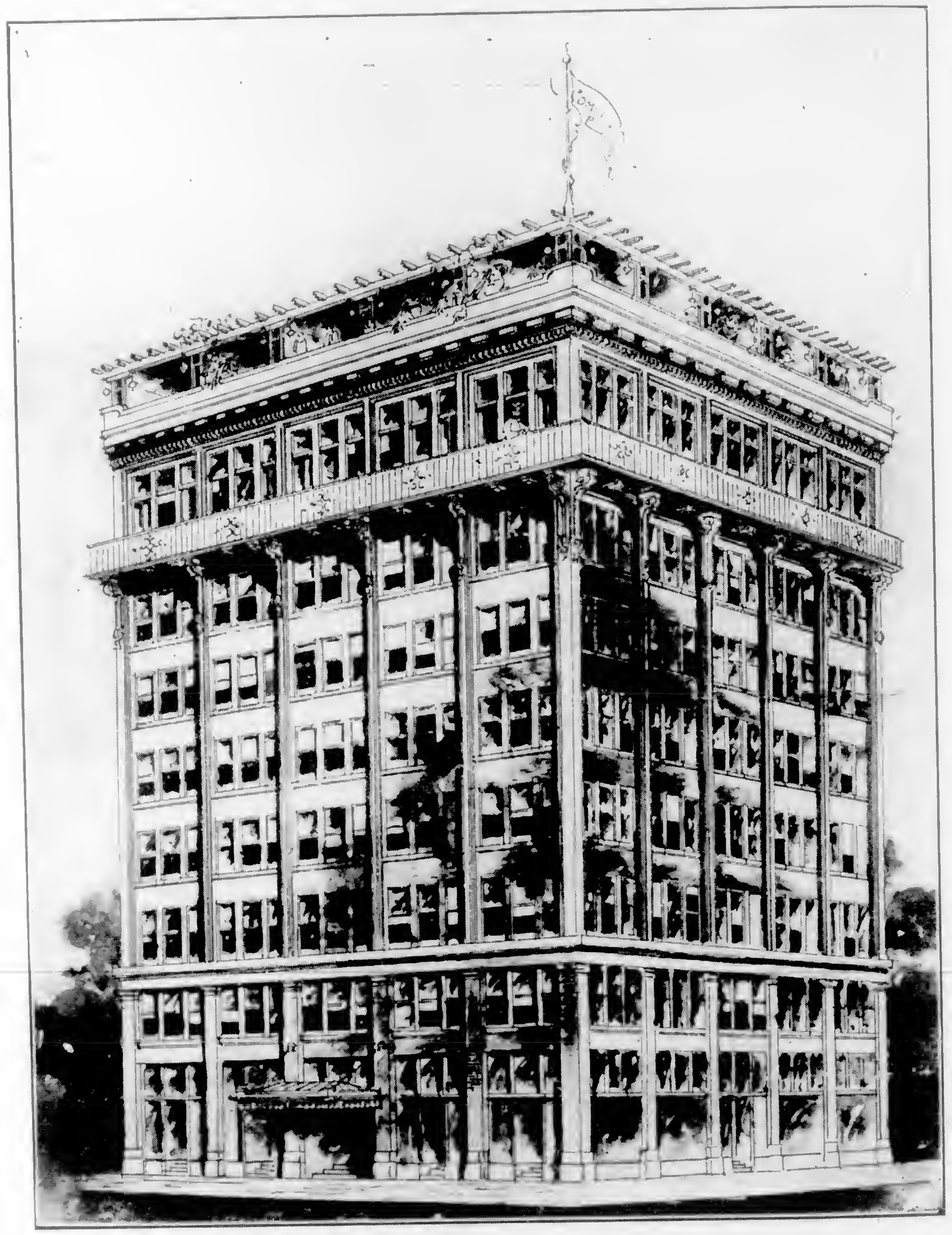

New Commercial Club Building, Portland, Oregon
Whidden & Lewis, Architects

The Decorative Scheme of the New Commercial Club, Portland, Oregon

By E. F. LAWRENCE*

PORTLAND is the City of Roses, and the rose is the first bit of color that greets the eye in the new Commercial Club. The rose window on the landing of the grand staircase leading from the main office on the seventh floor to the dining rooms on the eighth floor is an example of art glass of rare beauty, showing the Rose City from a rose arbor in Portland Heights. The roses, the birds, and the butterflies, the white of the architectural parts against the deep greens of the firs make an excellent foreground to the city, and the distant mountains. The window is skillfully draped with old blue and gold.

The dominating color of the lobby and halls is obtained by using a rich deep "gold cloth tapestry," which admirably serves as a neutral from which to accent the various rooms. To the left of the lobby is the large lounging room, 40x100 feet, with quiet greens relieved by rich mahogany furniture in the center and touches of deep brown in the art glass domes. Here, also, is represented the verdure of the Oregon country in the wall coverings, a dignified panelled scenic effect. The rose motif is not forgotten and is seen in contrast to the freely treated wall panels in a conventional stencil on the hangings. This touch is echoed in the reading lamps, the art glass domes and the lanterns which light the room. The furniture is of a rich, luxurious pattern. About the border of the room are lounging chairs and davenports overstuffed in green morocco leather; in the center of the room are the massive mahogany reading tables and writing desks with their mahogany chairs, upholstered in green pan-mohair. The rose is here again conventionalized and is carved on the legs of each piece of furniture.

At the opposite end of the lobby and the side of the general office is the ladies' reception room, a Louis XVI, the room in a rich blue with light touches of gold in the furniture. A beautiful example of the work of Louis Akin hangs in this room.

On the seventh floor, also, are the card rooms with their "Hunt" screens and the bar with a "marine" frieze in greens and browns, quaint lanterns and dutch chairs.

On the eighth floor, reached by the grand staircase, are the dining-rooms and kitchen. The large dining room directly over the lounging room, has a high deep-toned wainscot of Oregon fir, over which is a rich maroon frieze of tapestry. Seven large groups of three windows each open directly to a balcony from which one sees well over the entire city. These windows are draped with light tan hangings over lace panels. The furniture is dark and of simple lines. Runners of maroon enrich the room below. The light fixtures are slightly Gothic.

The ladies' dining room is featured in blue and white with more delicate furniture.

The Board of Directors' dining room is a simple Gothic room with a vaulted ceiling, heavy Gothic fixtures, Gothic hangings, tile floor and gilded walls, panelled by dark wood stiles. A stenciled frieze is used above the wainscot.

On the sixth floor is the large billiard hall, running the entire length of the building. It is in brown with monks' cloth hangings.

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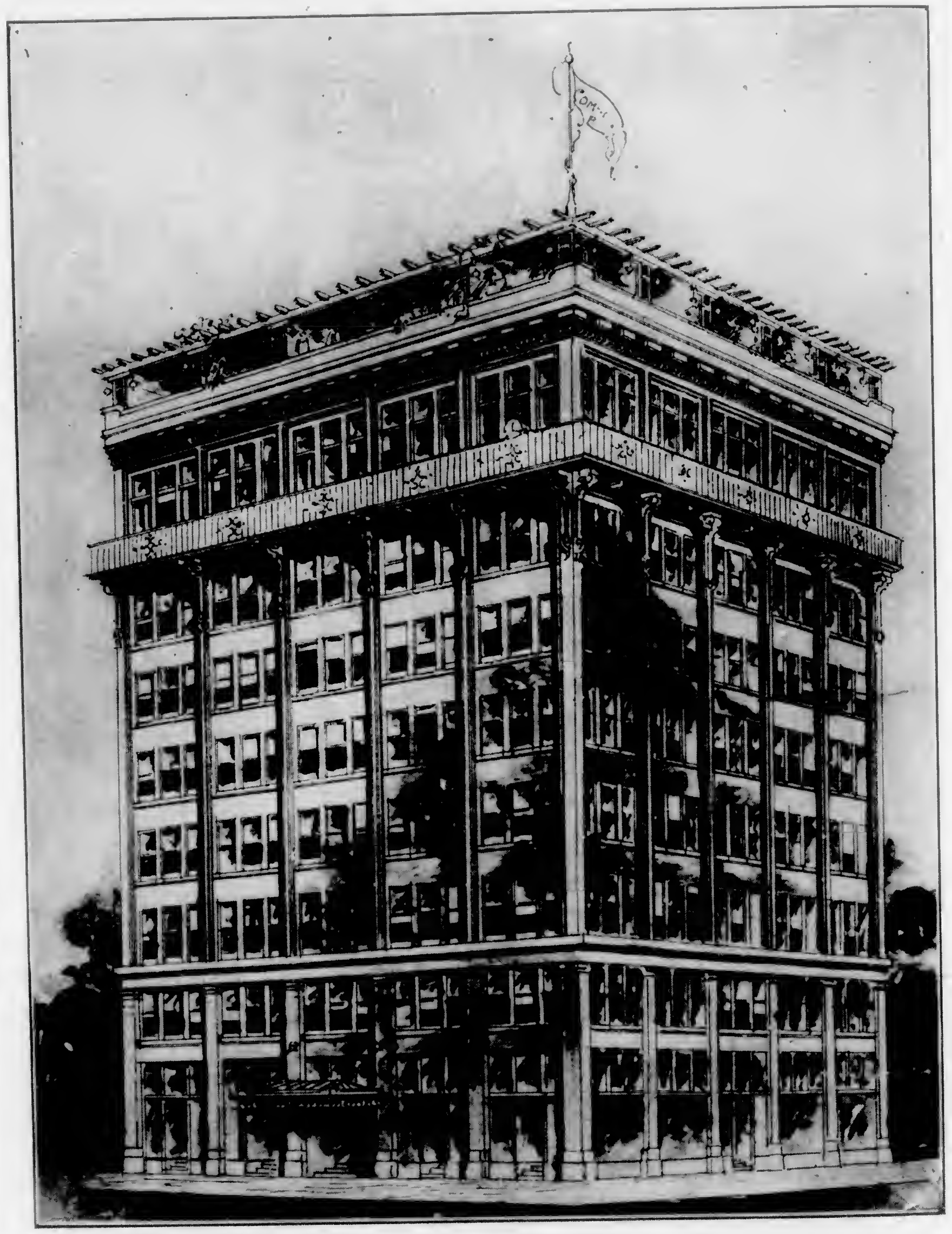
*Mr. Lawrence, who selected and designed the furnishings, is a member of the firm of McNaughton, Raymond & Lawrence, Portland architects. The Commercial Club building, in which the Portland Commercial Club occupies the three upper floors, was designed and constructed by Whidden & Lewis, Architects, Portland, Ore.



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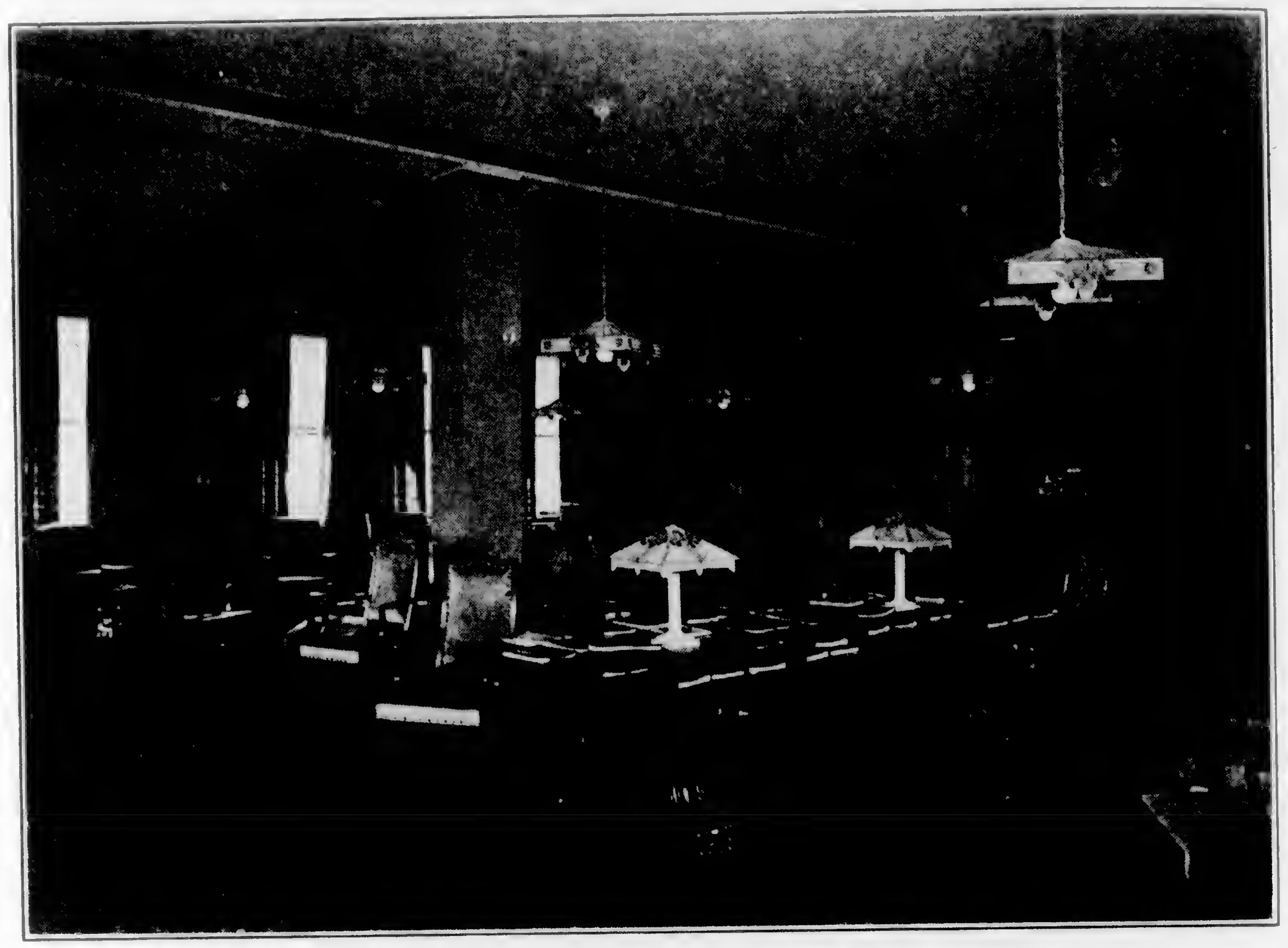
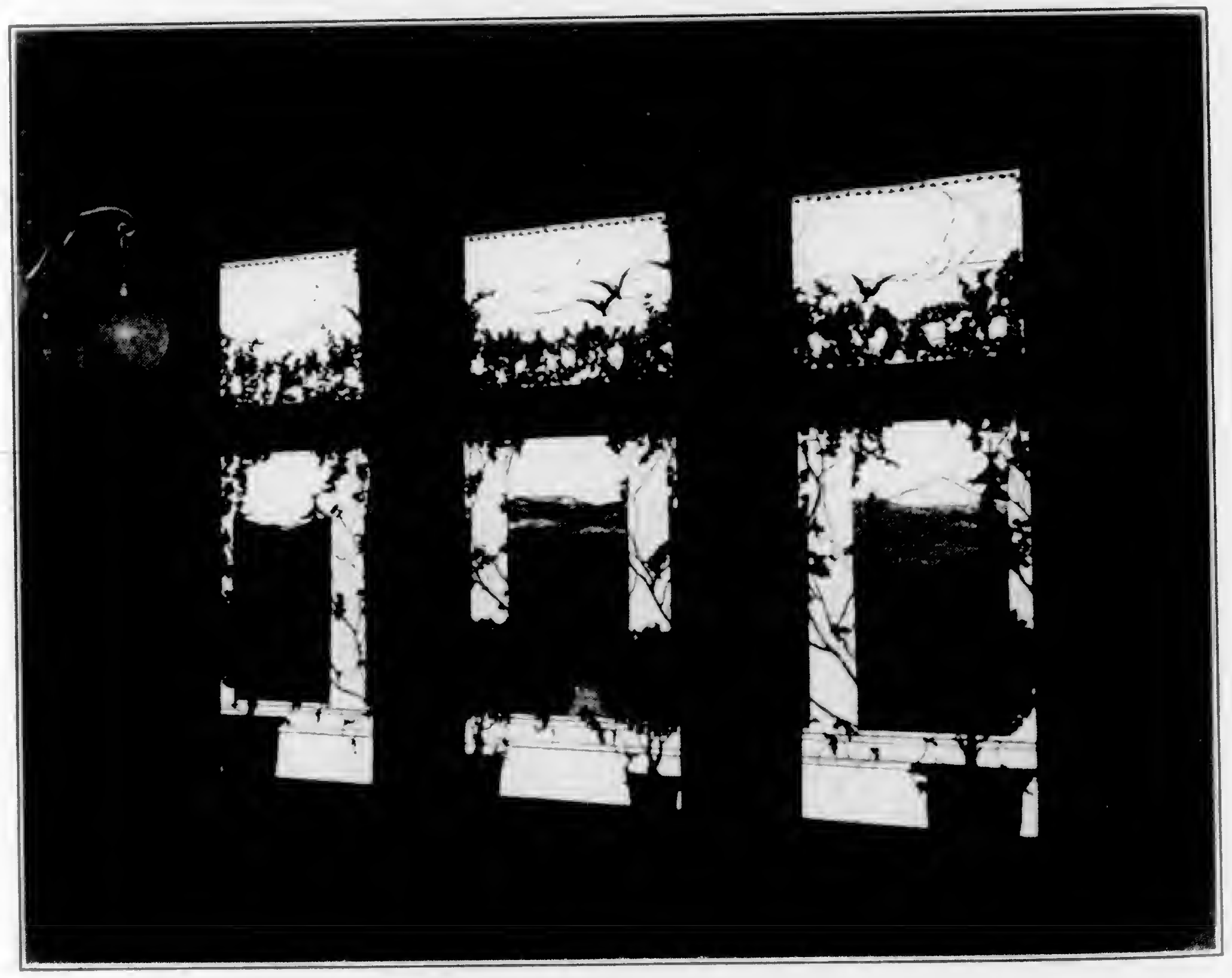
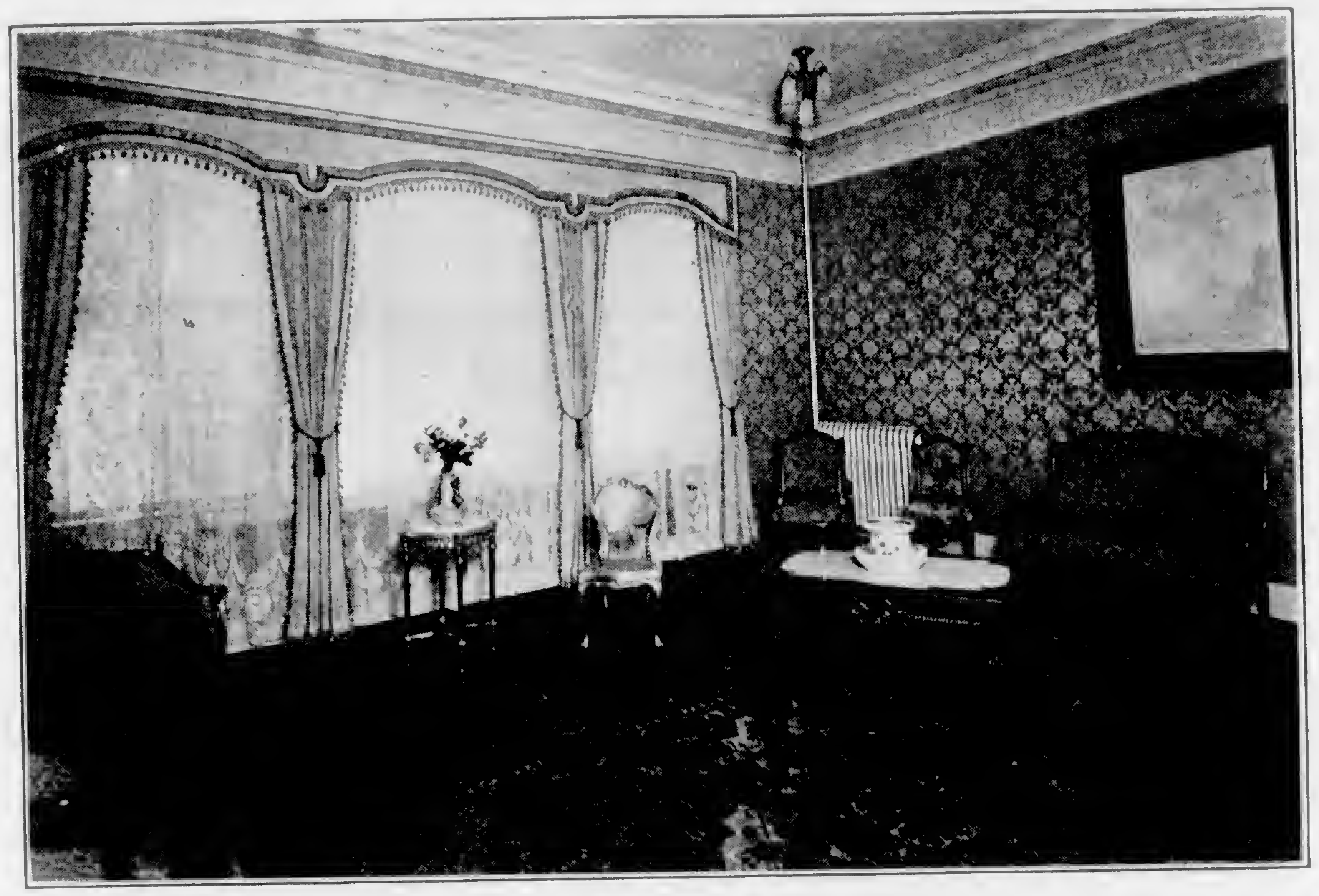


Lounging and Reading Room, Portland Commercial Club



Rose Window, Portland Commercial Club
Designed by Edward Bruns



Ladies' Parlor, Portland Commercial Club

A lounging room opens directly from the billiard room. It is carried out in the deep blue and brown greens. An extremely high panelled wainscot of dark wood is relieved by a narrow verdue tapestry frieze. The ceiling is beamed. The light fixtures have attractive domes in art glass. They are of the milking stool form and have landscapes executed in overlaid lead. The floor is tiled and the furniture is in dark oak and black leather.

The business offices of the Oregon Development League are on this floor and are luxurious in their fittings.

A large assembly room is also on this floor. It is executed in simple brown tones.

On the fifth floor are the chambers, twenty-four in number, with their private baths. A "state" chamber is reserved for guests of the Club, and is carried out in the Colonial style, with heavy Empire furniture, rich laces, and old-fashioned crystal light fixtures. An old blue floor and wall covering makes a rich setting for the strong color and lines of the mahogany. The balance of the rooms are furnished as living rooms rather than as chambers. The furniture, with the exception of the brass beds, is in oak and deep rich wall-papers and deeper-toned carpets predominate.

* * *

A New England contractor, who has had much experience in concrete construction and who has carefully noted the cost of his building operations, has compiled some most interesting figures showing the relative cost of what may be termed "mill construction" and reinforced concrete. In the case of six buildings on which he figured last year, both in mill construction and in reinforced concrete, there was a showing in every case in favor of the latter, varying from 4 to 11 per cent.

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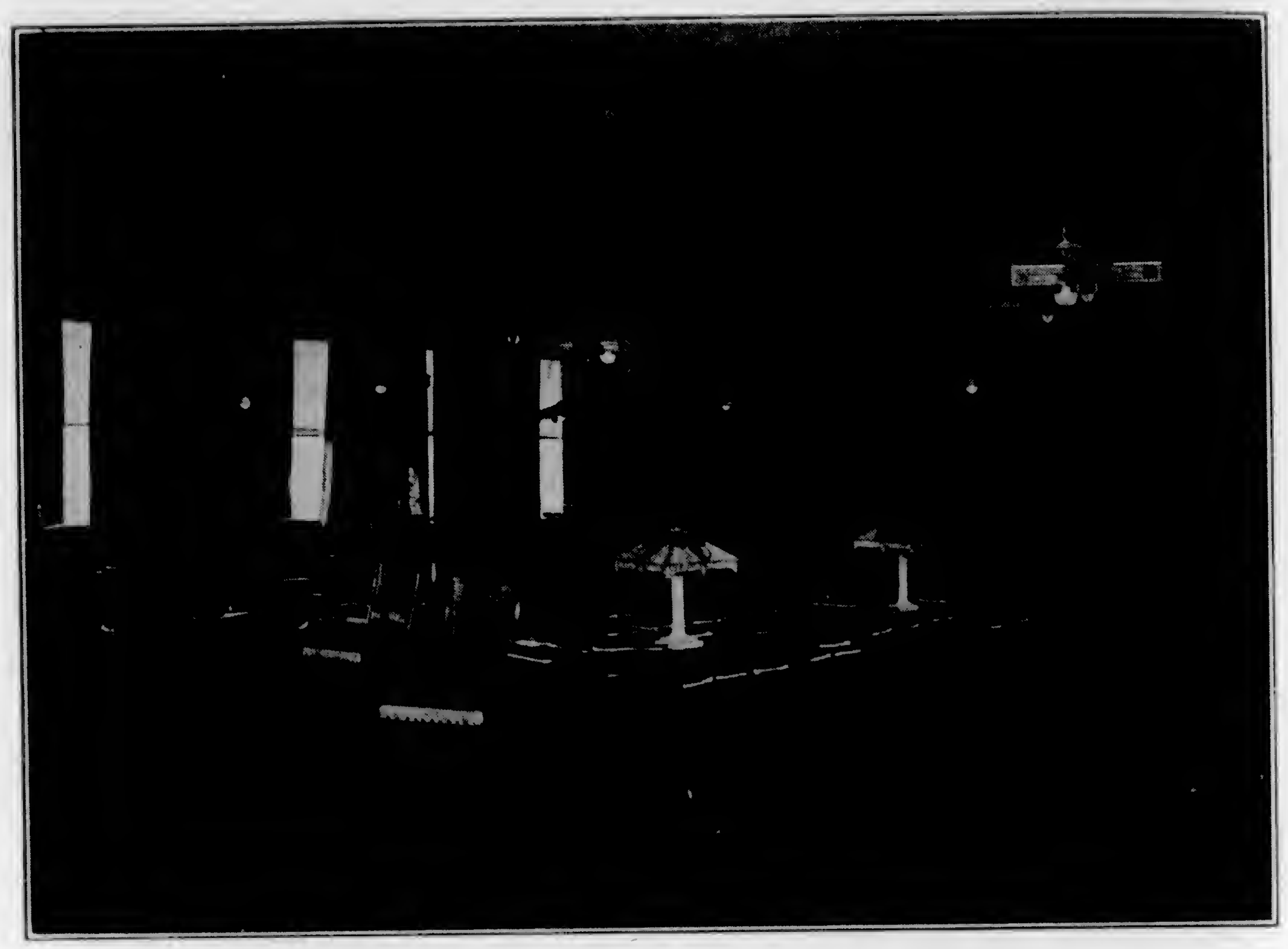
Surface opinion is largely a condition of surface conceit, weak in its expression and small in its purpose.



Lounging and Reading Room, Portland Commercial Club

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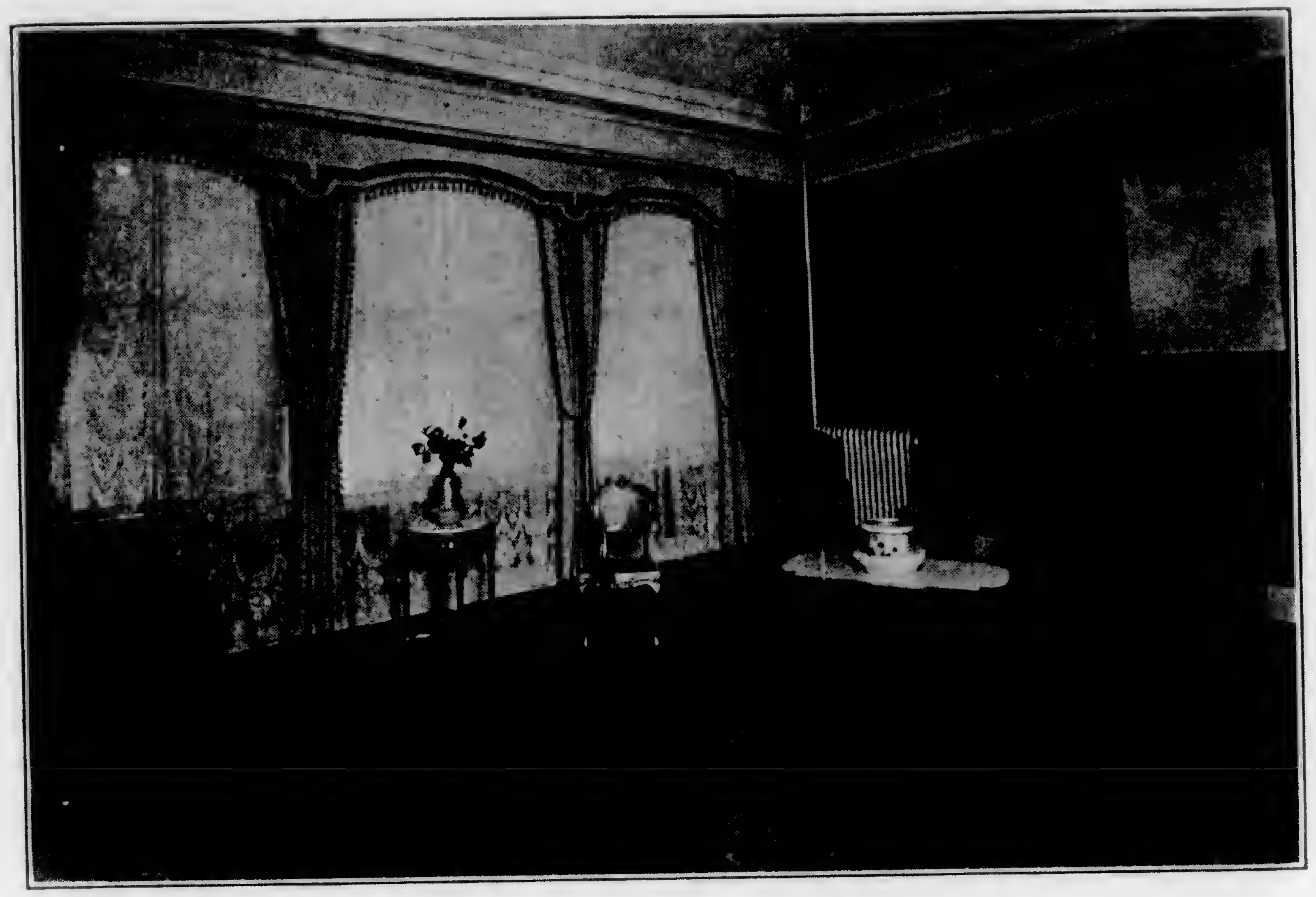

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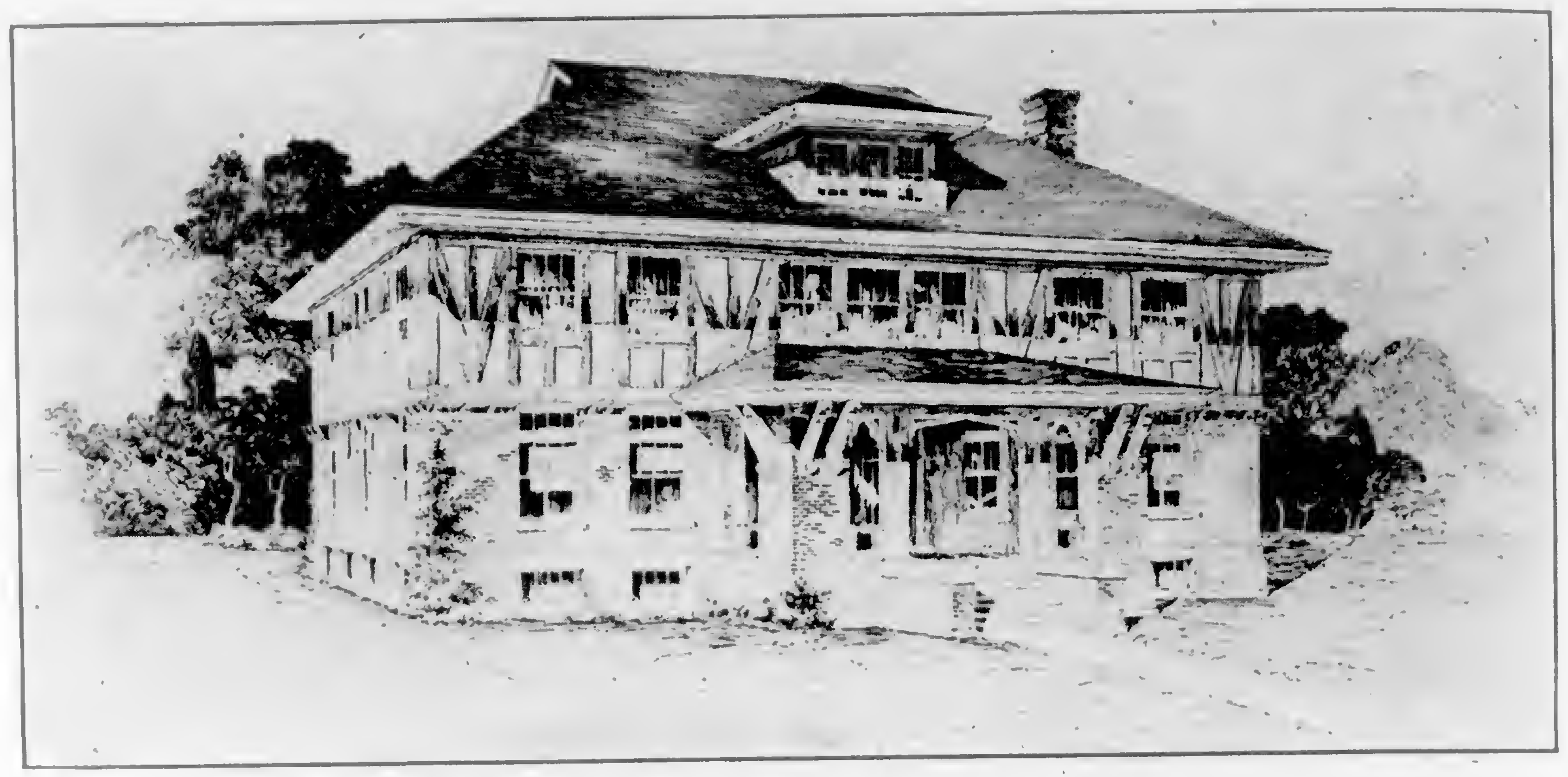


Y. M. C. A. Building for Oregon Agricultural College
McNaughton, Raymond & Lawrence, Architects

A College Y. M. C. A. Building

By E. B. McNAUGHTON, Architect

THE Y. M. C. A. building for the Oregon Agricultural College, illustrated in this number of the Architect and Engineer, is situated on the College Campus and is designed to harmonize with the present college buildings, the lowest story being of the red brick used in the more recent buildings of the college, while the upper part is finished after the Old English half-timbered style. The combination is a very happy one and should produce a building which will be a decided addition to the campus. The building is to cost, completed, in the neighborhood of $20,000, the plans and specifications having been prepared in the offices of McNaughton, Raymond & Lawrence of Portland.

The building will contain on the first floor, a large lounging room and reception room finished with beamed ceiling and quartered fir wainscoting. The center of interest in this room is to be a great fireplace built in red paving bricks, rugged, strong and simple, and about its generous hearth in the years to come will be laid foundations of many and abiding friendships. This floor also contains accommodations for the College paper editorial rooms, the Athletic Association and a meeting room for the Young Women's Christian Association, together with the usual offices and check rooms required for a building of this character.

The entire second floor is devoted to six large society rooms for use of the debating and literary clubs, the fraternities of the College, while in the basement provision has been made for the banqueting hall with generous kitchen accommodations. There is also located in this part of the building a large swimming pool, with lockers and shower rooms adjacent.

The building will be lighted and heated from the central power plant maintained by the College, and all its engineering and plumbing apparatus are to be of the most modern.

This building, with its well-planned conveniences, will fill a long-felt want in the life of the College, and it is bound to serve as a rallying point for all the general activity of the students. The undertaking has been largely financed by subscriptions raised among the students and the College alumni.

Again the Waterproofing Problem

By C. E. LOESSEL

THE so-called problem of making Portland cement plasters and concrete impervious to water has been the subject of much "technical" discussion from time immemorial. It has sometimes seemed to me that in these discussions certain fundamental principles have not always been emphasized, and that a clearer idea of the problem could be given, and its solution perhaps suggested, by getting down to the a b c of the whole proposition.

The first subject of inquiry might well be, Why is not a Portland cement plaster or concrete impervious to water? The answer might be that theoretically it is impervious to water. It is well known that by accurately grading and proportioning the aggregates and cement in accordance with scientific methods, and working the mix during the setting process, so as to artificially expel the air and water entrained in the gaging, an absolutely impermeable mass results. In other words, each particle is, in theory, placed in such juxtaposition with every other particle that when all air and water are expelled and the mass has reached its ultimate set, it constitutes a solid and consequently an impermeable body.

It is equally well known, however, that in practical work such a solid body is, for numerous reasons, not obtainable, and that even if it were, the cost thereof would be prohibitive. In practice, therefore, the completed work presents, not a solid mass, but a mass containing a greater or less volume of voids. No reference need here be made to voids consisting of imperfections or stone pockets. These do not necessarily affect the permeability of the mass, since, without considering the influence of capillarity, each imperfection or stone pocket may be so surrounded with perfectly combined material as to leave no channel for the passing of water into the pocket; and even when this is not the case, it is clear that, unless the work is so imperfect as to constitute a chain of pockets, the total volume of water passing *through* the mass would be neither greater nor less, inasmuch as the quantity passing through would be governed by the size and extent of the channels leading into and out of the pockets. The only voids, therefore, which need be here considered are those caused by the evaporation of water and the disentraining of air during the setting process of Portland cement mixtures. These voids cannot be eliminated in practical work, and they finally constitute a series of minute and irregular channels which permit the passage of water through the mass. In work otherwise properly done, the total volume of these voids runs from an almost inappreciable percentage in a neat mix to one per cent in fairly rich plasters and to two per cent and over in concrete 1:2:4 and leaner.

It follows, therefore, that the reason why Portland cement plasters and concrete are not impervious to water is that through the natural evaporation of the gaging water and the expulsion of entrained air, the mass ultimately contains a number of minute channels, a certain percentage of which are so connected with one another as to permit water to pass through the whole mass, and with continuing percolation of water, these channels will of course become enlarged and a greater number connected.

To get down to the a b c again, the problem of waterproofing a concrete mass may be compared to that of preventing the passage of water through a hair-fine tube of any conceivable degree of crookedness and irregularity. The only difference is that instead of one tube there are hundreds or thousands; but it is obvious that the same method which will prevent the passage of water through a single tube may be as effectively applied to any number of tubes.

There are in general use three methods of doing this:

1. The method of imposing over the top opening of the tube a film or coating of heterogeneous material, such as the various washes and paints manufactured for that purpose.

2. The method of breaking the tube at some convenient point and inserting at the break a layer of heterogeneous material, such as asphalt or water-proof felts.

3. The method of filling the tube with a homogeneous material, such as the compound used under the Sylvester process and the well-known Medusa Compound.

In considering these three methods, we may here disregard ulterior objections, if any, which inhere in the method. We will consider nothing but the relative efficacy of the respective methods for preventing the passage of water through the tube. We will assume that the respective materials used as a film or coating in the first method, as a layer in the second, and as a filling in the third, are all composed of substances which are in themselves actually waterproof.

Now, then, the question may be submitted to the common sense of anyone interested: Which of these three methods is most likely to permanently prevent the passing of any water through the tube?

* * *

Myself and Me

I'm the best pal that I ever had;
I like to be with me;
I like to sit and tell myself
Things confidentially.

I often sit and ask me
If I shouldn't or I should,
And I find that my advice to me
Is always pretty good.

I never got acquainted with myself
Till here of late,
And I find myself a bully chum—
I treat me simply great.

I talk with me and walk with me,
And show me right and wrong;
I never knew how well myself
And me could get along.

I never try to cheat me,
I'm as truthful as can be;
No matter what may come or go,
I'm on the square with me.

It's great to know yourself and have
A pal that's all your own;
To be such company for yourself
You're never left alone.

You'll try to dodge the masses
And you'll find a crowd's a joke;
If you only treat yourself as well
As you treat other folk.

I've made a study of myself,
Compared with me the lot,
And I have finally concluded
I'm the best friend I've got.

Just get together with yourself
And trust yourself with you,
And you'll be surprised how well yourself
Will like you if you do.

—From "Brains."

Women as Architects

DURING the last few weeks, certain London daily papers have been making an entirely unreasonable fuss about the delinquencies of architects with regard to domestic buildings, and have suggested that ladies were much more suited to design works of this class. The principal argument has been that architects, as a rule, forget to supply a sufficient number of cupboards, as if these certainly useful accessories could not be just as well introduced by any architect, and would be so introduced, if they were demanded by the client, or even hinted at by the client's wife, when the plans were being prepared. As a matter of fact, however, the greater number of people prefer furniture to fixtures of this sort, particularly in bedrooms, while doctors most emphatically endorse the use of pieces of furniture, which can be removed during the annual spring-cleaning, rather than an unlighted cupboard, which remains unventilated, and necessarily possesses dark corners, where spiders and dirt have it all their own way. In America, the large cupboard, still to be found in old country farmhouses here, is usually provided in all rooms; but it is by no means an unmitigated blessing, while it occupies a large amount of valuable floor area, which can generally be utilized to better effect by throwing it into the room.

It is many years now since the question of the advisability of ladies practising as architects was first seriously raised, and if the arguments were no stronger in favor of women entering the architectural field than those put forward in the papers just recently, the case would be an exceedingly feeble one. On the face of it, there seems little reason why women should not succeed in architecture as well as, let us say, in portrait-painting or novel-writing; yet the fact remains that although many ladies are good novelists, and some are good painters, and even good sculptors, none have yet successfully entered the field against man in many other callings, of which architecture is one. It is not, as some seem to think, that they are unfitted for the practical side of the work, interviewing clients, controlling clerks of works and contractors, and supervising material; for, after all, most of this can be done by skilled assistants, while it is not very far removed from much of the work which a lady doctor or nurse has of necessity to do. Primarily, an architect's work is that of designing and planning, the necessary mental capacity and artistic instinct combined with a sound knowledge of the materials employed, and their capabilities, all apparently being within the range of a woman's compass. Yet—and we say this in spite of the fact that a few ladies have courageously taken up the profession of architecture, and have attained to moderate proficiency therein—we submit that generally, if not universally, the female intellect has, so far, proved its incapability of producing high-class architectural work. It is much the same, it may be said, with certain other callings, such as law, and with them, as with architecture, there is apparently no reason for it. Much the same mental capacity is necessary for planning a house or great public building as for planning a novel, very similar artistic instinct is required for designing a mansion as for painting a satisfactory landscape picture. Possibly, some lady in the future may show that architectural work is not beyond her sex; but up to the present nothing material has been done. It seems as if women can criticise better than they can create—that they have the power of seeing what is bad and what is good in the schemes produced by man more than the capacity for producing the good themselves. Even in little things they have a wonderful inability to grasp practical essentials.

Some few years ago, within our knowledge, a design for a small house was prepared for a lady client. As is usual, she wanted a good deal of accommodation for a very little money; and, being dissatisfied with all of several schemes which her architect produced for her inspection, she said she was certain she could make a better plan herself, and she set to work to do so, producing it before long for his inspection with a considerable amount of pride. She had certainly obtained large rooms out of small compass, but she had done it by getting rid of the hall entirely, running up a staircase between two walls so as to block all entrance to the dining-room, and by giving a headway to the staircase of some 4 feet. Staircases, by the way, are generally stumbling-blocks to women. Another lady architect of our acquaintance had exceedingly magnificent ideas until she came to put them upon paper, when her plans consisted mostly of wandering and unlighted passages, leading by devious routes to numerous dissociated small rooms. On the other hand, she could design surface decoration, furniture, and other accessories with some amount of skill. Is it not in this direction, we would ask, that woman's talent might be best directed? Many ladies now take up such work as this; but they generally do so at art schools, and without any idea of there being any architectural basis for their work, with the result that much of what they produce is utterly unsatisfactory in execution, though good as a design upon paper. We venture to think that for such it would be a good thing to spend a year or two in the study of architecture, not with the idea of practising as architects, but in order to obtain the necessary basic knowledge of styles, as well as of traditional details, to enable them to produce work in applied ornament which shall be in conformity with the building which it is intended to enrich. Very much of modern designing is based upon natural forms, with the result that a new school is arising—and a very beautiful school, too—of art decorators. When, however, these nature-taught designers begin to apply their work to practical use, they are often hopelessly at sea. A little while since an excellent book was issued under some such title as "Design for Schools," in which plant forms were analysed, and then conventionalized, with the idea of producing repeat patterns. Toward the end some examples were given of the application of such work to carpets and to iron gates; but the gates, at least, were unconstructional, the ornamental filling of the panels being made, for example, to rest upon the leaves of thin, beaten metal, and not upon the more substantial stems. This was the work of a man, who ought to have known better; but, if a man can so far go astray, surely a woman may be forgiven for doing the same, if she has not been first taught that ornament, when applied to anything solid, must be in conformity with the material used, and have a constructional basis—and, we might add, a traditional architectural basis also. It is not necessary, as was done in this particular case, to introduce a thorn to represent a Gothic cusp upon a gate carried by debased Renaissance posts. This sort of thing may not be recognized by the average lady artist as being in the least degree out of place, but it is enough to set the teeth on edge of any cultured architect, or, in fact, of any cultured man or woman who may happen to have studied architectural detail.

There is, consequently, little to be said against women undergoing a course of architectural training, provided that they recognize their limitations sufficiently soon, and restrict themselves to such branches of architectural work as will be of use to them as designers of applied ornament. If any should develop unusual skill for planning and designing houses, or even churches, hospitals, and public buildings, let them do so by all means, but in conjunction with men who can grasp and thoroughly understand the structural problems involved, and who are prepared to undertake the more strenuous part of an architect's work.

One further limitation we would mention. Men usually work standing at the drawing-board. This is all very well when the boards are small; but large drawings necessitate large boards, and the strain of reaching over is considerable. It is physically more than any woman should be called upon to bear—infinitely worse than standing for long hours in a draper's shop, which all humanitarians agree to be more than should be allowed without a possibility of rest. Women can paint at an easel, but physically they are quite unfit to work at a large drawing-board.—The Building News, London.

* * *

Memorial Windows

FEW people who casually observe a piece of art glass, as shown in memorial windows, or less ornate residential effects, with the details bound in strips of lead, realize what a complicated process must be gone through before the work is completed.

The Foster memorial window in St. John's Presbyterian church at Lake street and First avenue, San Francisco, is an excellent example of artistic art glass work. In size alone it is the largest piece of art glass ever made in the state or brought into it. The dimensions are 18 by 35 feet. The scene depicted shows the ravens feeding Elijah, who is seated by a brook, the waters of which seem to be running and dancing when the light shines through the window. The perspective in this scene is as perfect as in a painting. Bordering the noble and dignified central figure, with its gracefully falling draperies, are ornamentations in keeping with the gothic style of the church. Passion flowers and pomegranates predominate, and in the quatrefoil above, the burning bush is shown. This is one of the most ambitious pieces of work ever carried out by the California Art Glass Works. The studio at 938 Howard street is now working on some important orders for private houses and public buildings. One of these consists of a series of five windows which are to be in the principal room of a handsome mansion now in course of erection. They depict with entire faithfulness some of the most beautiful scenes in California. Waterfalls and streams are shown, and in these, as in the church window referred to the effect of running water is beautifully attained.

William Schroeder, the president of the California Art Glass Works, is proud of the fact that his firm was one of the very first to resume operations after the fire. He feels fortunate, too, that he saved from the fire a dozen medals, one gold, that he received from the Paris Exposition and others awarded him at the Lewis and Clark Exposition and at various state and Mechanics' fairs in this state.

Recent Legal Decisions of Interest to Architects and Builders

Compiled by JOHN E. BRADY, of the New York Bar

Powers of Contractor

A CONTRACTOR being only a special agent of the owner, with limited power, his authority to bind the property benefited for the payment of the value of the material extends only to such material as is reasonably and ordinarily sufficient properly to construct or repair the building in accordance with the plans and specifications thereof, or in pursuance of the agreement and contract entered into between the owner and the builder.—Valley Lumber & Mfg. Co. v. Nickerson, Supreme Court of Idaho, 93 Pac. Rep. 24.

Compensation of Architect

Where an architect had prepared plans and specifications for the erection of a building under a written contract with the owner, providing for compensation at a fixed percentage of the cost of the building, the architect also agreeing to supervise the construction work, and subsequently the owner arbitrarily abandoned the work so that supervision by the architect became impossible, it was held that the architect was entitled to recover from the owner the reasonable value of the services performed prior to the abandonment. Where the owner, after having entered into a building contract, decides not to go on with the work he must pay for the benefits which he has derived from the architect's services. Under such conditions the law implies from the contract a condition that, in the event of the abandonment of the undertaking by the owner, so as to prevent complete performance of his contract by the architect, the latter may recover in an action at law the reasonable value of the work which he had done pursuant to the contract.—Stephen v. Camden & Philadelphia Soap Co., Court of Errors and Appeals of New Jersey, 68 Atl. Rep. 69.

Right to Recover on Contract Not Fully Performed

In an action to recover the contract price for the construction of a ditch, it appeared that the grade of the ditch for over one-ninth of its length was not in accordance with its specifications, and the slope of the upper bank was not what had been stipulated for, and the testimony tended to show that the ditch had not been completed when the action was brought. In deciding that the plaintiff was not entitled to a judgment the court referred to the common law rule under which a party, to entitle himself to compensation under a written contract for services, was required to show a full and exact performance. The rule has been relaxed by many courts in building contracts, and it was held that the same principle should apply to a contract for the construction of a ditch. Where the proceedings warrant it, the tendency of the courts is to permit a recovery, even though there has not been an exact and literal compliance, if the contract has been substantially performed in good faith, and the work accepted by defendant, when plaintiff can show the value of his services. But the action must be brought for the reasonable value of the services rendered. In the present instance the plaintiff, instead of bringing his action in such form, relied upon a special contract and, having failed to show full performance, he could not recover.—Lombard v. Overland Ditch & Reservoir Co., Supreme Court of Colorado, 92 Pac. Rep. 694.

Effect of Waiver of Stipulation in Building Contract

One of the conditions of a building contract was that "all finished floors should be thoroughly kiln dried and taken from the kiln directly to the

machine and then direct to the building, and only as fast as wanted for laying." At the request of the contractor this provision of the specifications was waived so as to allow him to have the flooring kiln dried in the Southern states where it was purchased, and put through the planing mill and matching machine there before being shipped to the place where the building was being erected. Over 100,000 feet of flooring was used in the building and, by reason of the waiver of the provision mentioned, the cost to the contractor was reduced by $7 per thousand feet. In an action brought against the owner by the contractor, the owner attempted to establish a counter claim for the amount saved to the contractor as a result of the waiver of the stipulation in regard to the flooring, but it was held that the owner was not entitled to such a counterclaim. The object of the contractor in requesting the waiver was doubtless to enable him to obtain a better bargain in the purchase of kiln-dried flooring and the consent to have the flooring kiln dried in the Southern states was unconditional. If the owner had shown that the flooring absorbed moisture while being transferred to the building, or became injured or damaged in some other way, or that the completed floors were inferior to the floors required by the specifications, a different question would have been presented, but, under the circumstances shown, the owner was not entitled to collect from the contractor.—Thomas W. Finucane Co. v. Board of Education of City of Rochester, Court of Appeals of New York, 82 N. E. Rep. 737.

Contractor's Right to Compensation for Extra Work

A contractor agreed in writing with a municipality to lay a sewer pipe of the required dimensions along a certain route, at an average depth of 16 feet, in a locality which was supposed to be quite free from rock, upon a bid of $1.50 per lineal foot. The bid was to include compensation for removing rock from the sewer trenches, and no extra compensation was to be allowed for tunneling. The agreement provided for a change in the route by the engineer of the municipality, if desired, any increase in the amount of work thereby required to be paid for at the price established for such work under the contract. A change was made in the route whereby the depth of the sewer trench was much increased and the work of excavation was largely through rock. In an action by the contractor to recover compensation beyond that prescribed in the contract, it was held that he was not entitled to recover anything in addition to the $1.50 per foot agreed upon. He should have provided against such contingencies in his contract. The rule is that where one of two innocent parties must sustain a loss, the law casts it upon him who has agreed to sustain it, or rather the law leaves it where the agreement of the parties has put it. The law will not insert, for the benefit of one of the parties, by construction, an exception which the parties have not, either by design or neglect, inserted in their engagement.—Costa v. Crawford Township, Court of Errors and Appeals of New Jersey, 68 Atl. Rep. 160.

* * *

Mistress—Norah, I told you to give that man with the hand-organ a quarter to go down to the next block and grind his machine in front of Mr. Upps-Tart's house; and he's out here on our sidewalk again!

Norah—Yis, mum. He says th' leddy in the next block gave 'im half a dollar to come back here, mum.—Chicago Tribune.

* * *

It is the motive behind the sin that makes it one, and the virtue of intention that absolves a seeming wrong.

Casa Reposa—A Bungalow

By KARL H. NICKEL

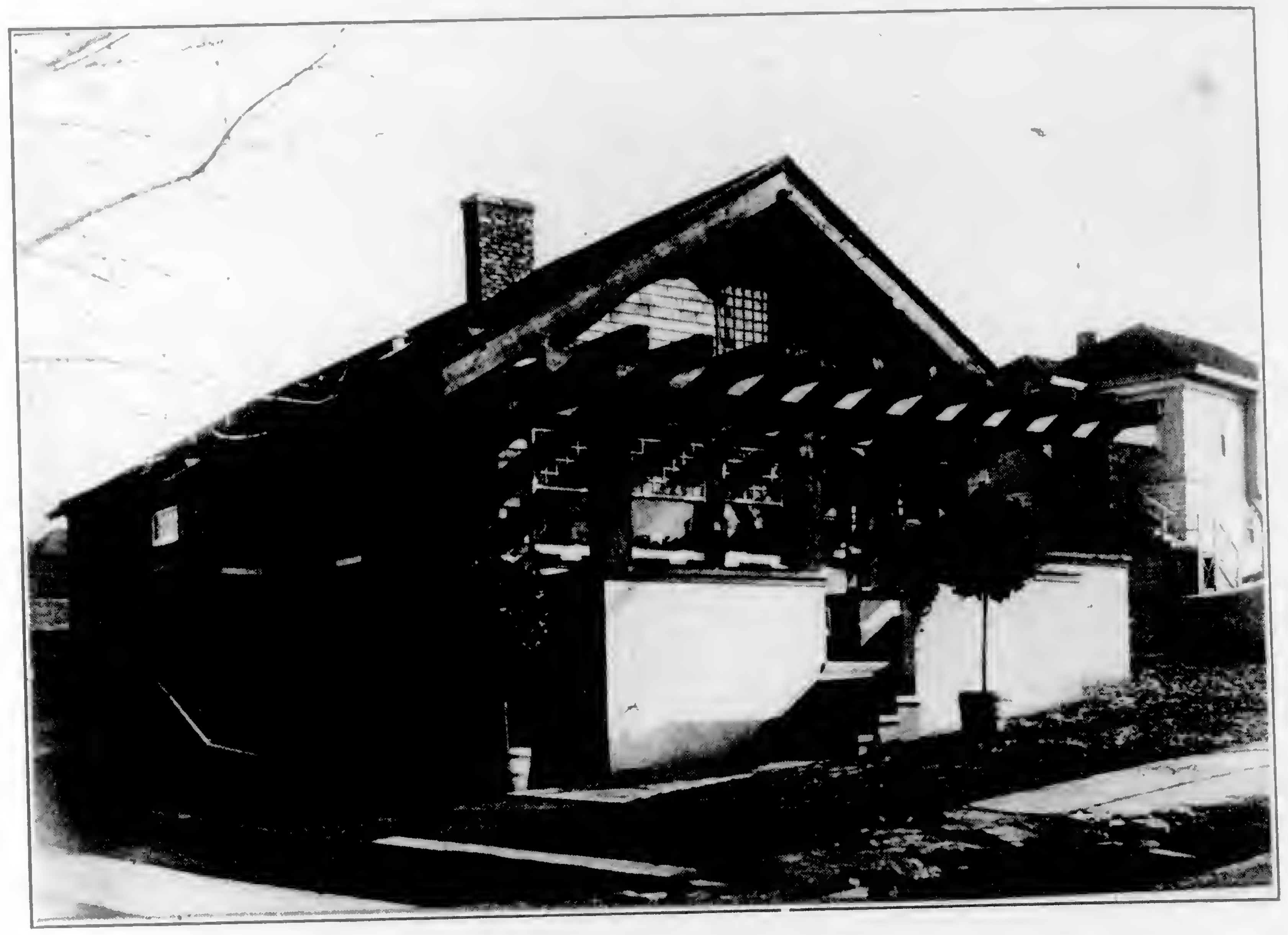
FOR years it has been the desire of the writer to embody in a small house all the comforts and conveniences usually included in more pretentious residences, striving always to keep in mind the needs of the family; first the housewife by lightening her labors as much as possible in the care of the house by providing conveniences that would enable her to do her housework in the shortest possible time and without the aid of servants; second, by providing comforts which appeal to the head of the family, making his home more attractive than his clubs. With this in view, a bungalow has been developed of which Casa Reposa, the subject of this article, is a type.

Entrance to the living room is gained by terraces built of concrete blocked off to represent tile. These terraces are surrounded by a concrete buttress of sufficient height to insure privacy. A heavy beam pergola covers the terrace. The living room, 14x23, is paneled to a height of nine feet, while the ceiling continues along the line of the roof to a height of thirteen feet, leaving the trusses exposed. The room is well lighted by eight windows. To the left of the arch to dining room is a fire place faced with boiler tile and surmounted by a plank shelf. Above the shelf is a miniature design of a house front, the doors and windows of which are the cupboard doors. To the left of the fire place is an old-fashioned settle.

The dining room is paneled to the stein shelf in leather, with tudor rose design. Between the stein shelf and plate shelf is a frieze also of a tudor rose design. One side of the room is taken up by a combination sideboard and china closet with a pass to the kitchen. The sink, stove and pantry are placed in recesses, leaving the kitchen rectangular. Over the stove

Casa Reposa—The Living Room

Casa Reposa—The Dining Room



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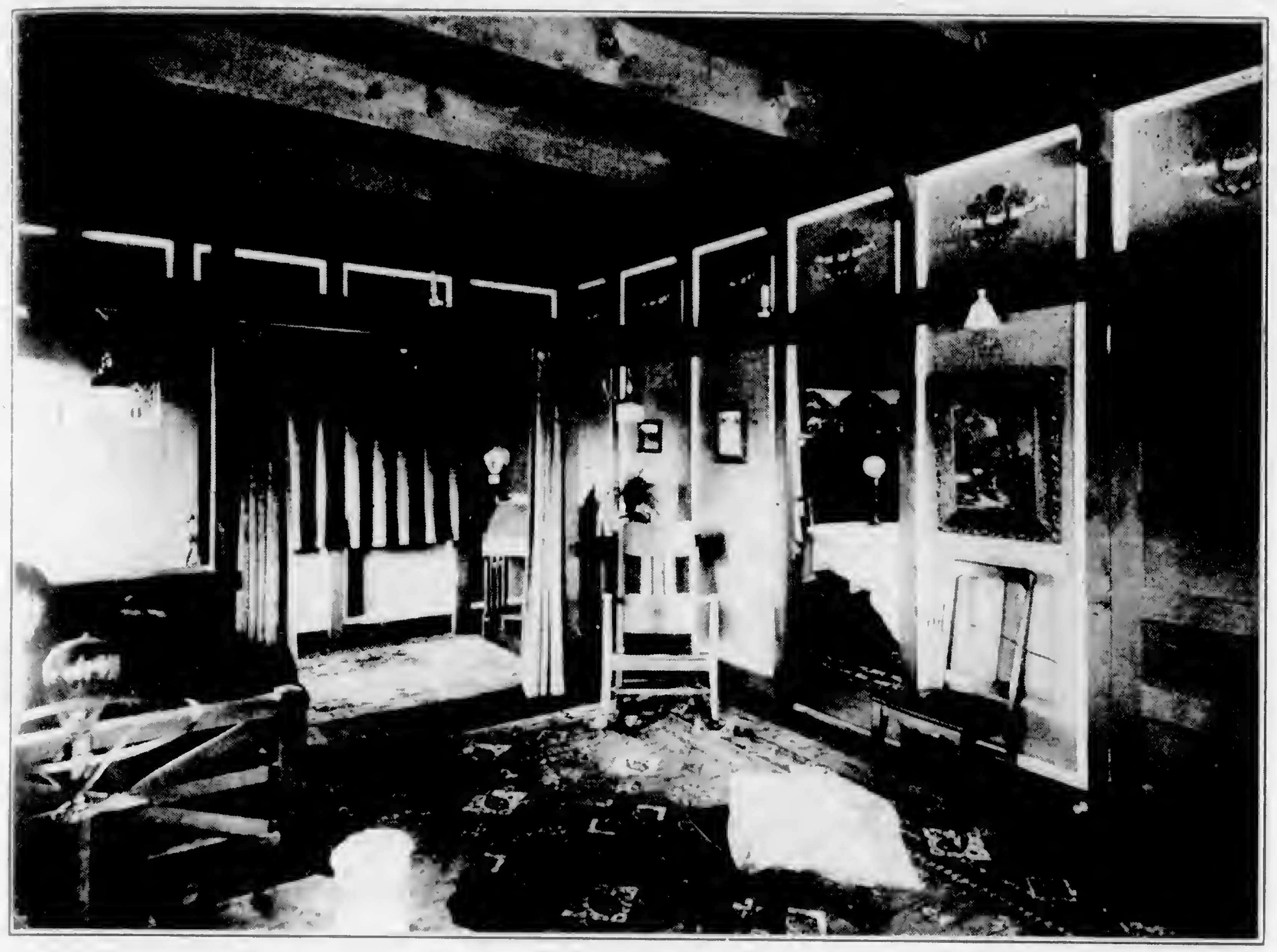
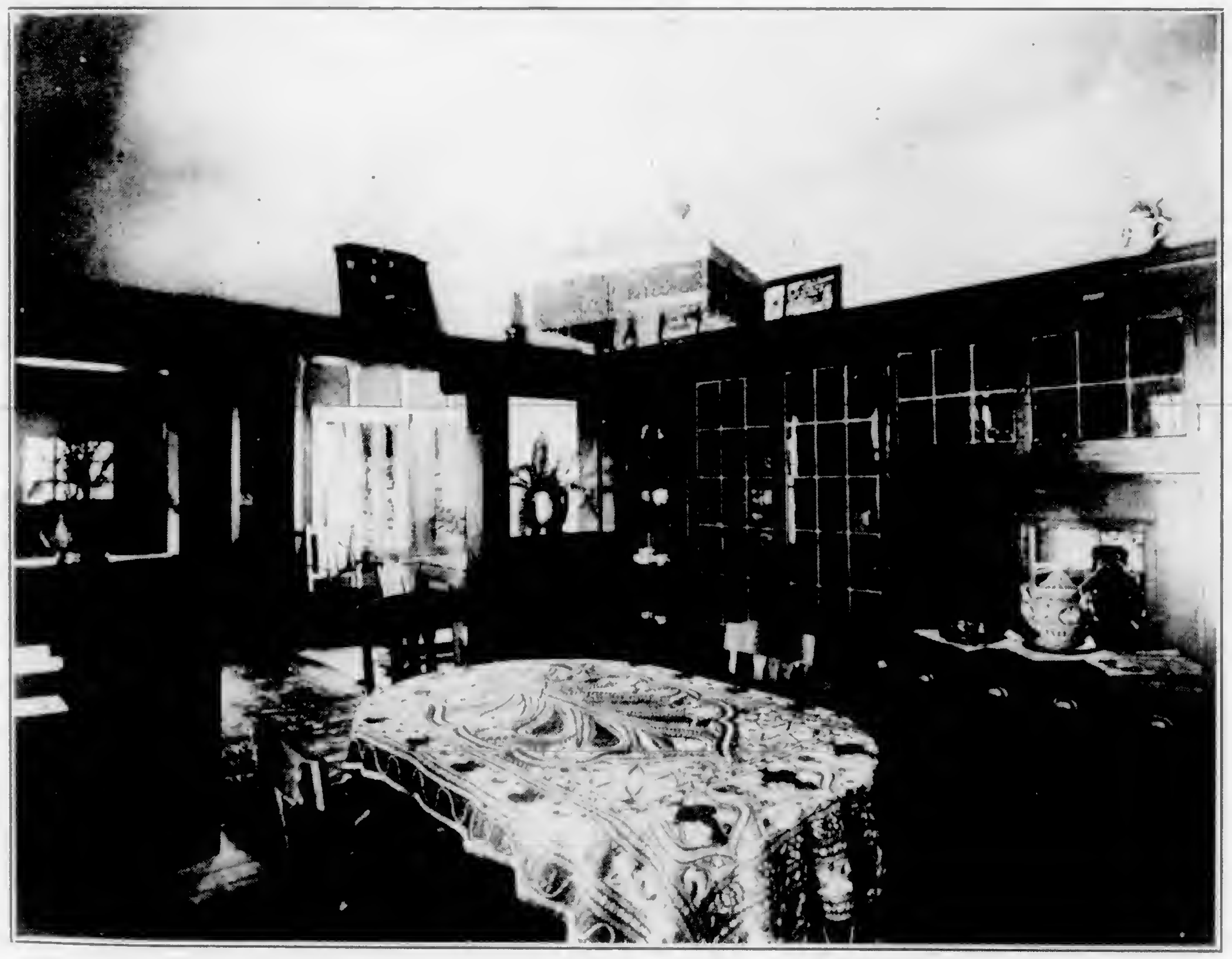
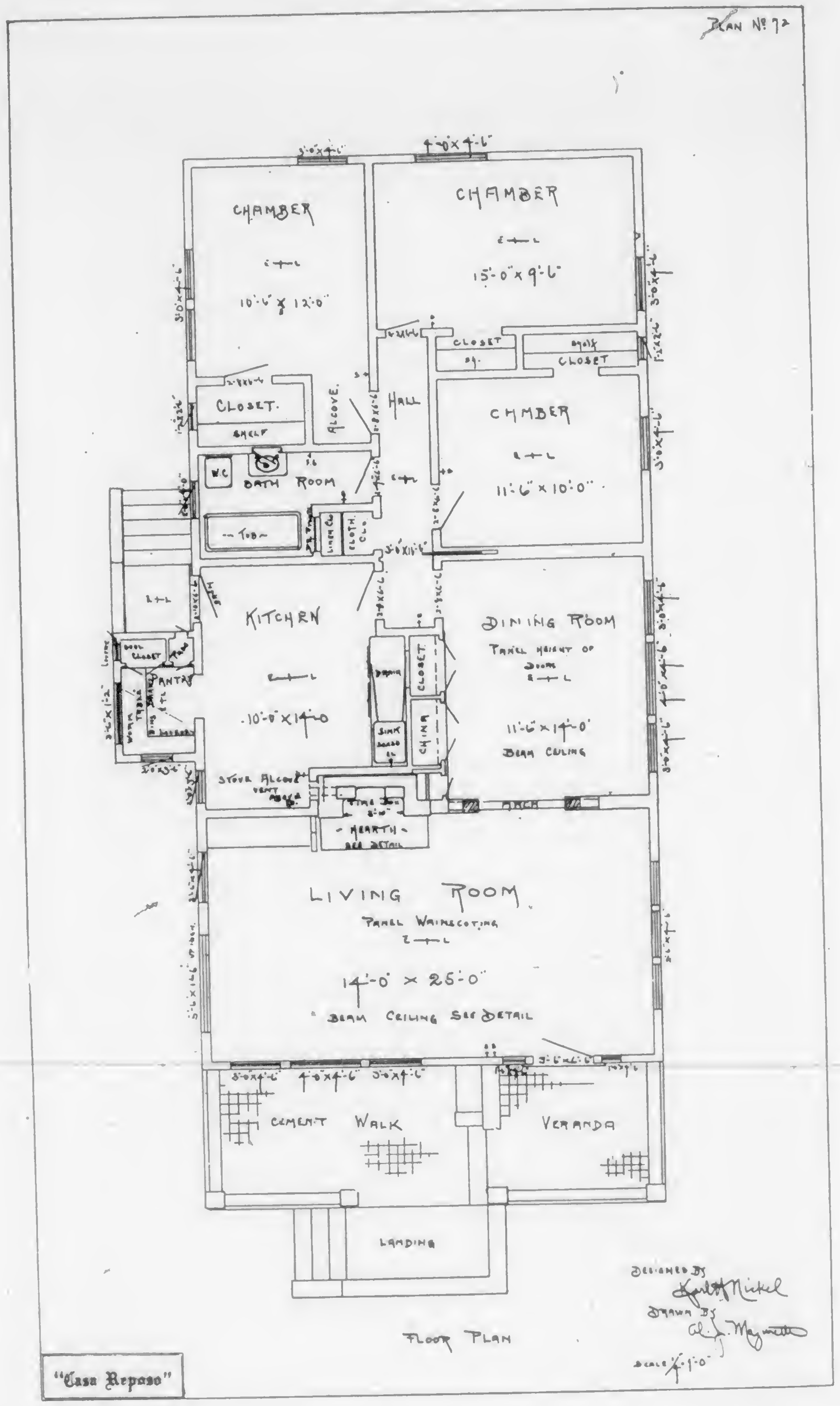


Casa Reposa—The Living Room



Casa Reposa—The Dining Room


Plan Nº 72
Chamber
10'-6" x 12'-0"
Chamber
15'-0" x 9'-6"
Closet
Shelf
Alcove
Hall
Closet
Closet
Chmber
11'-6" x 10'-0"
W.C.
Bath Room
Tub
Linen Clo.
Cloth Clo.
Kitchen
10'-0" x 14'-0"
Pantry
Cool Closet
Sink
Closet
China
Dining Room
Panel height of doors
11'-6" x 14'-0"
Beam Ceiling
Stove Alcove vent above
Hearth see detail
Arch
Living Room
Panel Wainscoting
14'-0" x 25'-0"
Beam Ceiling see Detail
Cement Walk
Veranda
Landing
Floor Plan
Designed by Karl H. Nickel
Drawn by
Scale ¼"-1'-0"

"Casa Reposo"

alcove a hood was built with vents to the roof, which will carry off all the steam and odor from cooking. The pantry is provided with counter shelves, flour bins, lockers, and a cooling closet. A hall gives access to three bedrooms, each contining a well-lighted closet, and also gives access to the bath room. A towel and medicine closet is provided in the bath room, while the linen closet opens on the hall.

Among the Architects

American Institute of Architects

(ORGANIZED 1857)

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FIRST VICE-PRESIDENT....JOHN M. DONALDSON, Detroit.
SECOND VICE-PRESIDENT....WILLIAM A. BORING, New York.
SECRETARY AND TREASURER......GLENN BROWN, Washington, D. C.
AUDITOR FOR TWO YEARS.....ROBERT STEAD Washington, D. C.

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For Two Years—Walter Cook, New York; Edgar V. Seeler, Philadelphia; J. L. Mauran, St. Louis, Mo.

For One Year — Alfred Stone, Providence, R. I.; Irving K. Pond, Chicago, Ill.; Ralph Adams Cram, Boston, Mass.

For Three Years—Frank Miles Day, Philadelphia; R. Clipston Sturgis, Boston; George Cary, Buffalo, N. Y.

Next Convention at Washington, D. C.

San Francisco Chapter of American Institute of Architects

PRESIDENT...........................ALBERT PISSIS
VICE-PRESIDENT...................WILLIAM MOOSER
SECRETARY-TREASURER....SYLVAIN SCHNAITTACHER
TRUSTEES.......................HENRY A. SCHULZE
WILLIAM CURLETT

Southern California Chapter.

PRESIDENT...................CARROLL H. BROWN
VICE-PRESIDENT...................MYRON HUNT
TREASURER................AUGUST WACKERBARTH
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Board of Directors

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TRUSTEES.....................OCTAVIUS MORGAN
SUMNER P. HUNT
WM. S. HEBBARD

Los Angeles Architects Meet

The regular monthly meeting of Southern California Chapter, A. I. A., was held on Tuesday evening, May 19th, at Levy's cafe, Los Angeles, and was well attended. In addition to the general business items disposed of, the directors also held a meeting and reported on a number of questions which had been previously submitted to them.

Architect Arthur Roland Kelly was unanimously elected to membership.

The chapter decided to contribute to the fund for obtaining prizes in the competition planned by the Washington, D. C., chapter of the institute for decorative schemes for Pennsylvania avenue, at the Capitol, Inauguration Day, March 4, 1909. All members of the institute are asked to submit designs for the plan of decoration, and prizes will be awarded by a committee of well-known architects. The National Society of Fine Arts and the Washington Chapter have each contributed $100.

Architect Timothy Walsh, a member of the Boston firm of Maginnis, Walsh & Sullivan, who has been a resident of Los Angeles for the past two years, was present and announced that he would shortly leave for the East for an indefinite stay. He went to Los Angeles for the express purpose of erecting the magnificent Catholic cathedral, but on account of the financial stringency, its erection has been delayed.

The association regretted the necessary action of Mr. Walsh, and the members individually expressed themselves to the retiring member.

The next meeting will be held in September, and a special program will be prepared.

New Building for Pomona College

Through the generostiy of Dr. D. K. Pearsons, the Chicago philanthropist, Pomona College is to receive a gift of $25,000, and this sum will be supplemented with $15,000 additional. The money will be used in the erection of a men's dormitory, which will be of reinforced concrete construction. It is hoped to have it ready for occupancy next fall. Rev. C. B. Sumner, financial secretary of the college, has the matter in charge.

The Contractor's Soliloquy

"To cut, or not to cut, that is the question.
Whether 'tis not better in the end
To let the chap who knows not the worth
Have the work at cut-throat price, or,
To take up arms against his competition,
And, by opposing cut for cut, end it.
To cut, and by cutting put the other cutter
Out of business! 'tis a consummation
Devoutly to be wished. To cut, to slash,
Perchance myself get it in the neck,
Ay, there's the rub; for when one starts
To meet the other fellow's price, 'tis like as not
He's up against it good and hard.
To cut and slash is not to end confusion
And the many evils the trade is pestered with;
Nay, nay, Pauline; 'tis but the forerunner
Of debt and mortgage such course portends.
'Tis well to get the price the work is worth
And not be bullied into doing it
For what So-and-So will do it for.
Price-cutting doth appear unseemly
And fit only for the man who knows not
What his work is worth, and who, ere long,
By every stress of making vain comparison
'Twixt bank account and liabilities,
Will make his exit from the business."

More Schools for San Diego

The San Diego Board of Education at its last meeting adopted resolutions recommending the expenditure of $40,000 in the erection of new schools, a four-room building to cost $15,000 at Brooklyn Heights, and an eight-room addition to the Logan Heights school, the cost of which is estimated at $25,000. Both buildings will be of brick construction.

New Church

The Presbyterians of San Bernardino are planning the erection of a new church edifice during the summer months. The church trustees have secured a building site on E street, between Sixth and Seventh streets. Rev. A. G. Fessenden, formerly of Los Angeles, is pastor of the church.

University Science Building

The plans of Architects Holmes Bros. of Tucson, Ariz., were accepted by the Board of Regents of the University of Arizona, for the new science building to be erected on the college grounds at Tucson. It will be three stories high, 146x60 feet in size, and of brick construction. It will cost, when completed, $40,000.

San Francisco's City Hall

In a report on the San Francisco City Hall and what should be done with it. City Architect Newton J. Tharp declares the building is of excellent design, but that its complete restoration will cost, according to which of two suggested plans may be adopted, $4,550,000 or $5,250,000. For the former figure the structure may be rebuilt on the present foundation, which Architect Tharp declares to be in excellent condition, while the latter estimate represents the probable cost of rebuilding with a new foundation.

Two estimates are furnished for the rehabilitation of the dome and rotunda. One plan is that the dome and tower should be removed as far down as the top of the rotunda, the latter to be covered with a new dome, low and of light construction. This would cost, it is estimated, $3,036,000. The second plan provides for taking down dome and rotunda and rebuilding them on the old design. The estimated expense is $3,965,000.

Under the plan of rebuilding the City Hall upon the present foundation the City Architect figures that a four-story modern steel frame, fire and earthquake proof building of new design, "except that it would follow the same general excellent arrangement and outline as at present," may be constructed within three years if the funds are made available. The extra floor would be within the height limit of the old three-story building, the rooms of the original structure being too high as to ceilings for heat, light and ventilation.

The rebuilding, including the foundation, the architect estimates, would take four years.

Personal Mention

A Portland exchange says: William E. Leland, S. B., of San Francisco, a consulting engineer who was associated with the construction of the Federal building in Portland, is in the city on a few days' visit. After the Federal building here was completed, Mr. Leland went to San Francisco, where he was associated in construction of the magnificent postoffice structure. After the earthquake, he went into business on his own account, and has prospered.

$225,000 Concrete Structure

The building permit authorizing the construction of the proposed eight-story and basement building at San Diego for Henry Timken, has been granted by the board of public works of that city. The plans were prepared by Architect Harrison Albright of Los Angeles, and call for a reinforced concrete structure, the total cost of which is estimated at $225,000.

Architect Mathews Vindicated

It is now the sacred law of Marin county, Cal., that homes of architectural rarity may be duplicated. Superior Judge Lennon has ruled that Armond de Courtieux, a butcher, may have built for him the same sort of house that F. V. Madison, an attorney practicing in San Francisco, proudly dwells in. The court also held that Architect Edgar Mathews of San Francisco may duplicate his designs, for, Judge Lennon held, Mathews has a certain personality which he expresses in the houses he builds, and to restrain this personality by an injunction would mean to deprive him of his means of livelihood and stifle art.

The question of architecture came up in an injunction suit brought by Madison to restrain Mathews from constructing for De Courtieux, the local butcher, a home near the Madison domicile on the same quaint lines that had made the Madison mansion a joy to the Madison heart.

Madison claimed that the peculiar old English cut of his home should not be duplicated in this world, or at least not in San Rafael, and when the embryo home of the man from whom he purchased his steaks and chops assumed the lines of his own home the attorney waxed wroth and brought suit. Judge Lennon ruled as follows:

"If this injunction were granted it would have the practical effect of putting Architect Mathews out of business, because his personality expresses itself in a certain type of house, and this injunction seeks to restrain him from constructing that type. The application for a restraining order is therefore denied."

Architectural League of America

The Architectural League of America announces the date and place for holding the next convention of the league as September 17, 18, and 19, at Detroit, under the auspices of the Detroit Architectural Club.

It is hoped that the members of the league will make unusual efforts to be present at this convention, for apart from the personal pleasure and benefit derived from attending is to be considered the interest and enthusiasm that will be added to the cause by giving it the sanction of their presence.

This urging may seem somewhat premature, but as the inactive season of the clubs is almost at hand and the convention will be held before the clubs take up their fall work, it seems proper to bring this matter to the attention of the members while they are still interested in active club work, and it is scarcely hoped that all will make every effort to attend.

For the information of those who desire to secure the Architectural Annual, before the supply is exhausted it is announced that the same can be secured from M. A. Vinson, 205 Caxton Building, Cleveland, O.

The Annual contains many items of interest to the members of the league relative to the various architectural clubs, and many illustrations of important works and articles of interest to the profession at large.

The revised constitution and by-laws which were amended to meet the requirements and conditions governing individual membership established the first of this year, can be secured by applying to H. S. McAllister, permanent secretary, 729 Fifteenth street, N. W., Washington, D. C.

The Competitive System

The following clipped from a recent issue of the Boston Herald presents certain phases of the competitive system in the selection of an architect, that reads almost like a burlesque of present methods:

"On the eve of erecting a $250,000 building for a new classical high school in Lynn, Mass., members of the city government have discovered that all the plans which architects, in response to a request from the board of public works have submitted, are for a building larger than the lot on which the new school is to stand.

"The preliminary steps of the work have been in charge of the school board and the board of public works, and it was only within a day or two that the aldermen discovered the plans were for a school bigger than the lot of land, and that while the different sets of plans were supposed to be anonymous, those in charge knew from which architect each of the four sets came. It has also been learned that no provision has been made as to whether or not the interior of the school shall be of fireproof construction.

"Although each architect has submitted with his plan an estimate of the cost of the building, this was done without regard to the question of interior construction, and consequently the figures could not stand for much.

"Last year the heads of the school department informed the committee appointed to buy the land that a lot on North Common street, with a 200-foot front, would be large enough. The lot was purchased. This year the school board, when asked by the board of public works as to the type of school wanted, asked for one the size of which would more than cover the lot.

"The board of public works sent this request to the architects asked to compete, with the result that all plans are now too big

"The school board and the board of public works are now in a dispute as to the selection of one of the plans. The claim is made that the best plan is to be selected purely on its merits and without its being shown who the architect is that drew it. Each plan is designated by a letter and, in theory, is supposed to be anonymous."

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EAST LOOKS WEST FOR BUSINESS

Every day one sees fresh evidence of confidence on the part of the East in Pacific Coast business. More Eastern concerns are seeking San Francisco trade today than at any time since the fire. Some say this is due to the general let-up back there. In a measure this is true. One company, whose factories otherwise would be idle, is running overtime filling orders for $2,000,000 worth of material for San Francisco. It is no secret that there is still plenty to be done here. The man who thinks San Francisco is already rebuilt and that from now on there will be a falling off in the volume of construction work has another guess.

Now and then we hear of a firm that has recalled its coast representative who has probably failed to "make good" and has convinced his employer that San Francisco is on the wane so far as building construction is concerned. But these instances are few, and probably the city is none the worse off by the loss of such an outfit. The real wide-awake Eastern house is not anxious to abandon San Francisco now. Far from it.

Business is right dull these days in the East. New buildings are in less demand than ever before, and while money is tight promoters are not going to tie it up in improved real estate. San Francisco, on the other hand, is the only city of any size in the world that is not overbuilt. Good times or bad times there is a certain amount of building to be done here that cannot be neglected. Wonderful strides have been made already but the building has nearly all been in business and commercial structures. There remain to be built apartment houses, schools, churches and factory buildings which will require an expenditure of several millions of dollars. Much of this money is at hand. Only a few days ago the Equitable Life Insurance Company loaned a San Francisco woman a quarter of a million dollars with which to complete a great Class A building. That shows there is no longer any hesitancy on the part of Eastern houses to advance us money.

A majority of the Eastern concerns that have established branches on the coast have shown a disposition to spend here at least a portion of the money received from San Franciscans. This is right and the company that holds to this policy will succeed. There are a few concerns, however, which deserve the failure which threatens them. They expect their representatives to do wonders but are not willing to spend a cent to accomplish these results. We have in mind a mail chute company that is flooding the Eastern magazines with advertising but isn't willing to spend a dollar on the Coast, yet expects a monopoly of the business. It may discover its mistake when it is too late.

PROPER PRESERVATION OF ARCHITECTURAL RELICS

The question of what to do with an old and monumental structure that has out-lived its practical use, yet has an ever increasing architectural and ethnological value, is now being squarely met at Columbus, Ohio, says the Western Architect. The State House, designed by Bulfinch, stands with the White House and the Octagon House at Washington as an expression of our earliest architecture. It is the more valuable, because it is the oldest public building west of the Alleghanies that remains without alteration, and was designed by a trained architect and is expressive of his time.

It may be a question whether it is worth while to preserve our relics, and if commercial and art advancement does not demand that we wipe the slate clear at every centennial, and only preserve that which will aid the advancement of each. But if, on the contrary, we wish to preserve the best that our forefathers left us, then the State House at Columbus should remain upon its site, a carefully preserved memorial to that advancement from small beginnings. It is ridiculous to talk about remodeling or adding to this building. It cannot be brought up to modern ideas of utility without wholly destroying just those features which make it valuable as an architectural relic.

WORLD'S COMPETITION FOR A SHAKESPEARE MEMORIAL

A competition that should excite a world-wide interest, both in an aesthetic sense and because of the general interest in the object, is that for a memorial to Shakespeare, to be erected in London, for which a fund of one million dollars is to be raised. The project, as far as outlined by the Shakespeare Memorial Committee, contemplates a world's competition open to English speaking races. The memorial is to be an architectural monument, including a statue, and the committee plans that each design in the competition be submitted by an architect in collaboration with a sculptor. The committee of selection will be composed of a sculptor, to be nominated by the American ambassador, Lord Esher, Lord Plymouth, Sir E. Poynter, P. R. A., Sir Aston Webb, R. A., Mr. Belcher, A. R. A., Mr. Thomas Brock, R. A., and Mr. Sidney Colvin.

Competitions

The Western University of Pennsylvania has made arrangements to hold a competition among architects, under the terms of a program prepared by Professor Warren P. Laird of the University of Pennsylvania. The prize of this competition will be the commission to design and supervise the first building to be constructed, that for the department of the School of Mines, for which a fund of $175,000 is now available.

LIGHTING AND HEATING

As Applied to Buildings

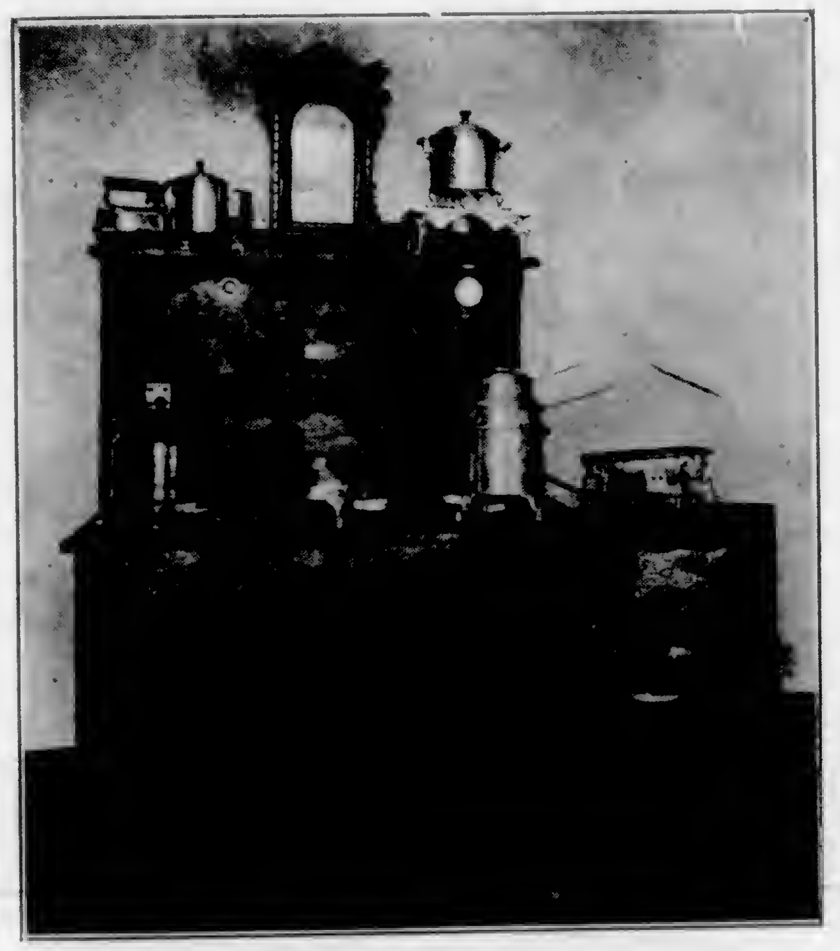
A Twentieth Century Home

The ideal twentieth-century home has just been completed at Carrollton, Ill. The house is constructed of concrete and there is not a sign of a chimney, although the building is supplied with an abundance of artificial light and heat. Neither is there any fire in the house, nor coal, nor ashes, nor dangerous gases.

While this wonderful residence, built by Mr. F. M. Sinsabaugh of the Carrollton Light, Heat and Power Company, is the first of its kind in the world, it is beyond a doubt a good example of what the average American home will be in a few years from now, when both wood and coal have become too expensive for common use.

Mr. Sinsabaugh's model home is two stories high, with attic and basement and has eight rooms on the two main floors. In building this dwelling Edison's idea of a concrete house to be poured in one big mould was not carried out, yet the foundation and walls are of concrete blocks. The concrete was mixed on the site and moulded into the building blocks as required. There was no waste of building material. The floors are of wood and the interior is finished in plaster and oak. The style of architecture is of the plain, substantial mission type.

Perhaps the most novel feature about this wonderful residence is the fact that it is heated by steam from a central station. There is no noisy, dusty furnace in the basement demanding daily attention all the long winter months. Instead the steam, which usually goes to waste about small electric light plants, is carried to the house by underground pipes. This steam pipe enters the house in the basement and is carried to the rooms just the same as the steam from an ordinary furnace. The rooms are heated with steam radiators. Of course some special arrangement had to be supplied to furnish hot water for the bath room.



Electric Kitchen in the 20th Century Home

Near the ceiling in the bath room is located a water tank which is kept constantly hot by a number of small pipes through which a continual flow of hot steam is maintained. This tank supplies hot water for the bath and to the wash bowls located in two of the upstairs bed rooms. Of course the house is also wired for electric heat in case anything should happen to the steam heating system.

When it is remembered that there are no fires about this modern dwelling the visitor begins to wonder how the meals are cooked. No steel range is visible in the neat and roomy kitchen. No sooty

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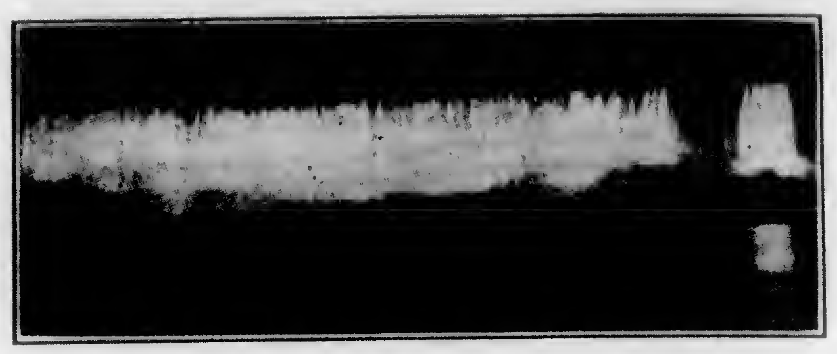
gas stove glares black and threatening from the side walls. The principal article of furniture seems to be an oak sideboard. This "sideboard" is nothing more or less than an electric stove. Back of the wooden cabinet is a small switchboard and all the utensils arranged on the stove are connected to this swtichboard with suitable wires and plugs. A turn of a switch and the electric teakettle is singing over invisible heat. With the same ease the frying pan, cereal cooker, griddle, broiler, vegetable cookers, etc., are made ready to do their share of the work of preparing a meal. Beside the cabinet sits the electric oven wherein the heat is so economized and concentrated that the choicest roast can be prepared in less time than it usually takes to start a slow coal fire. The other electrical kitchen devices, including the electric flatiron, are used in the same clean, simple and economical manner. There is no sweltering heat in the kitchen, no soot, no ashes, no dirt, no hot fires for ironing days; no lugging of heavy scuttles of coal from the basement.

In fact, so easily and conveniently are the meals cooked that the coffee, tea and toast are prepared right on the dining room table. The electric coffee percolator, at the turn of a switch, prepares the coffee while the cereal is being eaten and the toast is ready when the coffee is. The cost of cooking the meals by electricity in this home is estimated at less than $3.50 a month for a family of five persons .

By utilizing the waste steam from the electric light plant the cost of heating the house in cold weather is reduced to a minimum.

A Good Cement for Glass

Melt a little isinglass in spirits of wine; add a small quantity of water; warm the mixture gently over a moderate fire. When mixed by thoroughly melting it will form a perfectly transparent glue, which will unite glass so nicely and firmly that the joint will scarcely be noticed by the most critical eye.



The American Fall Illuminated

Illuminating Niagara

By Harold J. Shepstone

To see the Niagara Falls at their best one has now to inspect them at night, when the great expanse of falling water is lit up by beautiful colored lights. It is the greatest illuminating feat ever attempted, and a sight, once seen, never to be forgotten.

For years the people at Niagara have talked over the possibilities of making the falls attractive at night by illuminating them, but for a long time the problem baffled them. Visitors arriving in the neighborhood of the falls late in the evening have nothing particular to entertain them; they cannot see the falls, though, of course, they can hear the ceaseless roar of the waters. Various schemes have been suggested to make the great cataract attractive at night, but it was left to Mr. Anthony C. Douglass, the genial Mayor of the City of Niagara Falls, to show how the feat of illuminating the falls could be accomplished. He deserves the greatest praise for his enterprise, for it is possible now to see Niagara at night bathed in the most gorgeous colors.

Strictly speaking, there are two distinct waterfalls at Niagara. The river is split in two by a rocky outcrop known as Goat Island. The Canadian side is known as the Horseshoe or Canadian Fall, with a descent of a hundred and fifty-eight feet and a width of two thousand six hundred and forty feet, while on the other side of the island is the second cataract, the American Fall, one hundred and sixty-two feet deep, with a width of about a thousand feet. The volume of water that sweeps over these two chasms is about fifteen million cubic feet a minute.

It was on September 2d last that the falls were illuminated for the first time in their history. This feat was accomplished by the use of powerful searchlights. In all fifty searchlights were used, specially made for the purpose by the General Electric Company, the majority of them being equipped with thirty-inch projectors. They were placed in the necessary position by Mr. W. D'A. Ryan, illuminating engineer to the General Electric Company. One "light battery," so to speak, consisting of twenty-one searchlights, was planted in the gorge on the Canadian side of the river, near the Ontario Power Station. The lamps were arranged in the form of a crescent, their work being to light up both the American and the Horseshoe Falls. The second battery was placed on the cliffs above the power station, to throw their dazzling beams of light upon the upper portions of the falls, while a third battery was set up in Victoria Park to asist in lighting up the American Falls.

The necessary power to operate the searchlights was generated by the falls themselves, so it was in reality a case of Niagara lighting itself. It required three hundred electric horse-power to operate the plant, and the effect of the combined searchlights was to throw out a light equal to two hundred million candle-power. It is almost impossible for the lay mind to realize what two hundred million candle power rays mean. In order to make the illuminations more attractive, the new "color scintillator," which consists of a circular frame containing colored gelatine discs, was used in connection with the searchlights. By means of this device the great beams of light can be tinted with any color at the will of the operator. Thus, on the eventful night, a soft white light was first thrown on the American and Horse-

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shoe Falls. The spectators stood dumbfounded. They had never witnessed such a spectacle before. It looked as if the waters that plunged over the famous chasm had been converted into a silvery mass of molten metal.

The onlookers would have been satisfied at what they had already seen, but greater wonders were in store for them. Suddenly, as if by magic, the tumbling waters were changed into the deepest of blues. This color was followed by green, then yellow, red, and violet. Next darkness reigned for a few moments; then a small portion of the falls was lit up by a powerful white ray, the succeeding portion by a blue, and so on, until some dozen different colored waters were seen tumbling over the same ledge. Then the scheme was reversed. White rays played along the ridge of the cascade, while a few feet below the waters were of a different color, and so on, until the bottom of the falls was reached. Such harmony, such blending, was never witnessed before, the ever-moving, dancing spray-cloud creating effects that were fascinating and dazzling in the extreme. The intermingling of the colors surpassed all rainbow effects ever seen by day in this place of wondrous water beauties.

"No author has yet been able to describe the grandeur of the effect," said Mr. Douglass to the writer, and he is certainly correct. It would require a Tennyson to do the scene justice. The ordinary imagination fails in its attempt to describe the beauties of the flying mists and tumbling waters when illuminated from the outer darkness with all the splendor and glory of the great Northern Lights. The Horseshoe Fall afforded a magnificent opportunity for using a solid color, and either in red or blue its glory was beyond description. A decidedly charming effect was seen at the Horseshoe when red, white, and blue rays were flashed on different sections of the waters.

After the rays had been turned upon the waters for some time a number of bombs were discharged. The result of these explosives was the formation of smoke-clouds. As soon as these clouds appeared the searchlights in the gorge battery were at once turned upon them. The ascending smoke produced an artificial cloud effect that rendered possible wonderful color reflections. In some instances these cloud effects resembled star-clusters and were altogether very beautiful.

Occasionally the powerful electric rays were projected on to the famous steel bridge that spans the gorge below the falls, completely outlining the whole gigantic structure of steel and revealing the crowds gathered there to see the illuminations. Then the beams of light were thrown on the rapids below the falls, the effect in this instance being very grand. Presently the whole of the searchlights threw their beams upwards into the sky. These great white bars of light were visible a hundred miles away; indeed, they were faintly seen at Syracuse, a hundred and fifty miles distant!

As already stated, the falls were illuminated for the first time on September 2d last. In order to install the necessary plant, Mr. Douglass, the enterprising Mayor of Niagara Falls City, raised a fund of a thousand pounds. with this sum be was able to illuminate the falls for an hour nearly every night for a month. At the moment of writing he is busy making preparations for the installation of a permanent plant, which is to be in operation in 1908. This plant will be more powerful than the experimental one described, and it is computed that it will cost twenty thousand pounds and require six hundred pounds a year to operate it.—Ex.

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Copyrights Plans of His Home

In order to prevent other ambitious builders of artistic homes from copying the design of his new suburban residence, a wealthy resident of Spokane has copyrighted the plans and published to the world that no one else in the Falls city shall duplicate the house without the consent of Mr. Martin.

The house in question is a strikingly original and attractive building, which has just been completed in Spokane's well-known residential quarter. It conforms to no particular style of architecture, but bears a close resemblance to what is known as the Swiss bungalow.

The building is so altogether unique and unlike anything known to modern architecture that a description of its more salient points may not be uninteresting to prospective builders of attractive homes. The front porch, covered with the main roof, has a cobblestone floor and is inclosed with lattice. The pillars are shingled and between them is a built-in seat. The house rests on a rustic basalt foundation, and the massive exposed chimney is constructed of the same material. Brown shingled walls, with trimmings of ivory white, give to the house an unusual coloring. The windows have very small panes.

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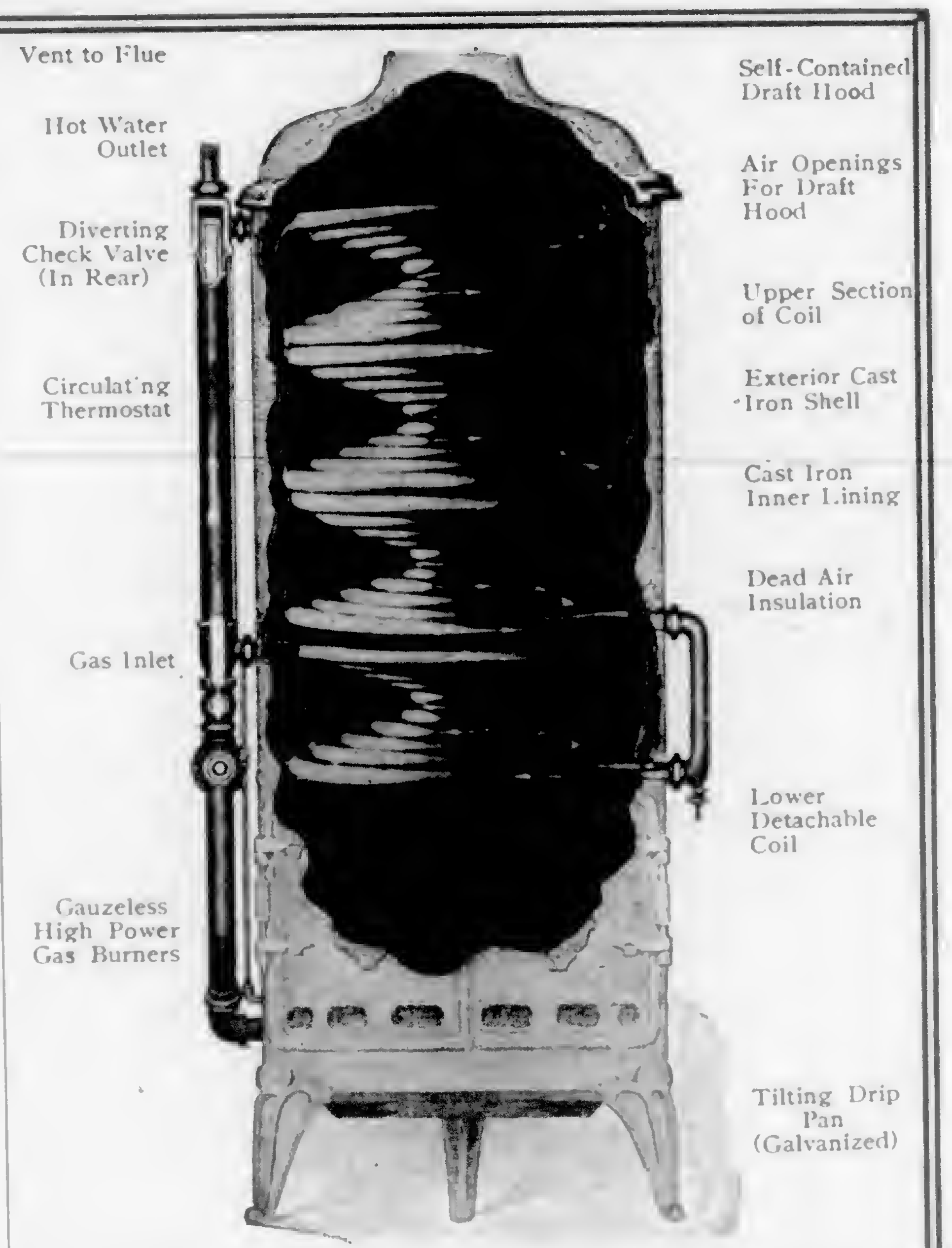

The hardware throughout the house is of brass, including a massive antique knocker.

The ceiling follows the lines of the roof and is spanned by solid beams. A massive fireplace constructed of honeycomb basalt rock, with heavy cement mantel shelf. The chimney breast is exposed to the ceiling and the hearth is vitrified brick, raised five inches above the floor level.

In the principal rooms the finish is select fir, stained brown, and the floors are waxed maple. The walls in the living-room are treated in golden brown and the ceiling in pumpkin yellow.

Delightful Dutch designs are carried out in the dining-room. There is delft blue paper wainscot to the height of the platerail, battened with fir strips, above which are Delft designs. The ceiling is treated in drab. The kitchen is finished throughout in white enamel. A unique feature of the house is a tank and sprinkler on the roof for use in cooling the house in hot weather.

There are but six rooms in the structure, yet it cost to build about $6000.

Coast Electrical Club

The electrical men of the Coast are being invited to join in the organization of a club. This project was ready to be launched in San Francisco two years ago, but the disrupting effects of the disaster of that time delayed its perfection until now. Personal needs and widely scattered business interests have so occupied the attention of possible members that the advantages of social organization have been neglected.

The proposed club offers a convenient center for congenial clans already organized, and also a rendezvous for those unattached. The former include the Electrical Trades Association, the Electrical Contractors' Association, the local members of the American Institute of Electrical Engineers, and the Sons of Jove. Each of these organizations have frequent meetings and dinners, whose expense might be reduced and whose attractiveness increased if held under the auspices, or, at least, in the quarters of such a club. It would in no way supersede or assume their functions; on the contrary, it would help them by promoting comfort and sociability.

As a nucleus, the club will rent and furnish a handsome room in a central building, offering every convenience of a first-class grill and hotel. There electrical men can foregather and amicably meet one another on a common basis. Visitors may be put up for a meal or a month where they can meet those they wish. Later an assembly hall will be provided, and regular meetings to hear practical papers on electrical matters are proposed.

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By the Way

Some Industrial Information Worth the While

W. W. Montague & Co.

The mantel and tile department of W. W. Montague & Company reports having taken the contract for supplying all the tile work in the James D. Phelan building, San Francisco. There will be something like 50,000 feet of floor tile in this great office building which was designed by Architect William Curlett. Thirty thousand feet of floor tile will also be laid by W. W. Montague in the Emporium building, besides about 4000 feet of white enamel brick tile in the great light shaft to the stair and elevator corridors of the Holmes building. The Montague & Co. did the tiling in the new Fairmont hotel, 180,000 square feet, which was one of the largest contracts of the kind ever taken on the coast. Original St. Francis hotel, 125,000 square feet; Flood building, 96,000; Pacific Union Club, 25,000; battleships California, Milwaukee and South Dakota, 13,500. All manufactured by the American Encaustic Tiling Company of Zonesville, Ohio. Besides office buildings and hotels many fine residences have been tiled by this company, including the palatial Spreckels mansion.

Mr. Webster, manager of the mantel and tile department of W. W. Montague & Co. is enjoying a well earned trip abroad and in his absence the department is in charge of George W. Hunt, a veteran, having served more than thirty-five years in the employ of W. W. Montague & Co. The several large contracts recently taken is evidence of Mr. Hunt's ability to take care of things during his chief's absence.

Good Sand for Concrete

The Marysville Sand, Cement Block and Brick Company is after San Francisco business; in fact the company is prepared to fill orders for its materials anywhere on the Coast. It has excellent shipping facilities. The plant has a capacity of 12,000 cement brick and 500 cement blocks per day. Fine pressed brick is the firm's specialty. A fine quality of sand is handled and is being shipped to any section at reasonable rates. Some recent shipments went so far north as Portland, Or. The sand is a crystallized quartz and possesses 98 per cent silica. Twelve cars of sand can be shipped daily. Write for further particulars.

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Roebling Construction Co.
OF NEW YORK
FIREPROOF CONSTRUCTION
AND
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Phone, Temporary 4312

WEST COAST MAHOGANY
JENISERO—SPANISH CEDAR
HAVE PROVED SUPERIOR TO OTHERS AND ARE MANUFACTURED HERE
WHY NOT SPECIFY AND USE THEM?
DIECKMANN HARDWOOD COMPANY
OFFICE, MERCHANTS' EXCHANGE MILL AND YARD, BEACH AND TAYLOR STS.
SAN FRANCISCO, CAL.

Elevator Company Busy

The Hammond Elevator Company of San Francisco may well feel proud of the business it has done since the fire in that city two years ago. It happened that one or two of the very few buildings not seriously damaged by the fire and earthquake were equipped with Hammond elevators so that this company enjoyed the distinction of having installed the only passenger lifts that were in operation immediately after the fire. Since then the Hammonds have been running their shops overtime to keep pace with orders for both passenger and freight elevators. Following is a partial list of the buildings which have been equipped with Hammond machines: United States Quartermaster's Department building at the foot of Van Ness avenue, Fairbanks, Morse building on First street, Security warehouse, Revere Rubber Company, Electrical Appliance Company. H. S. Crocker, Realty Improvement Company, Rosenblatt Company, E. Martin & Company, Second and Folsom, Gabriel, Meyerfield Printing Company, C. Shilling & Company, Maurice Rosenthal, Marcuse building, American theater, Western Union building, Sadler & Company, Shawmut building, First and Mission streets, Hotel Aneta, Turk street, Hotel Wells, six elevators in the Whitcomb Estate building, a six-story structure at Davis and Pacific streets, Hotel St. Raphael, Sherwin & Williams Company, Joseph Herrscher and the Rothchild building facing Union Square.

The company manufactures its machines in San Francisco and is in a position to fill orders anywhere on the coast. Its deliveries are prompt and careful, personal attention being given to all installations. This company's elevators do not infringe on any other company's patents or rights.

The Hammond Company is at the present time busy installing three large electric freight elevators, each of three tons capacity, in the new plant of the California Wine Association at Winehaven, Contra Costa county, California. The company's offices and factory are at Seventh and King streets, San Francisco.

Good Advertising Man

The friends of Edgar M. Swasey will be pleased to learn that he has again taken up the advertising business independently and beginning the first of June he assumed entire charge of the advertising end of the Paraffine Paint Company. The excellent work which Mr. Swasey did for this company before the fire will be recalled. It was largely due to Swasey's clever handling of the advertising that made this company known and talked about the entire length of the Pacific Coast. For the past year Swasey has been associated with M. F. Hadley, who took hold of the Paraffine Paint Company's advertising when Mr. Swasey went East just before the fire.

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VICE-PRES.
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PRISM GLASS IN SHEETS AND METAL SET
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Manufacturing Oil Burning Plants

The Bennett Petroleum Burner Company has equipped its building with one of the most complete plants for the manufacture of oil burning apparatus in the West and is prepared to turn out a superior line of goods to the trade. Prompt shipments are promised and the various equipments can be installed readily without the aid of experts. Any heating and ventilating companies can put them in without the slightest trouble. The Bennett New Process Pneumatic equipment is in use in many of the large office buildings, hotels, apartment houses and residences erected in San Francisco since the fire and they will be glad to furnish references upon application. The company's manufacturing plant and general offices are at 579-581 Howard street, San Francisco.

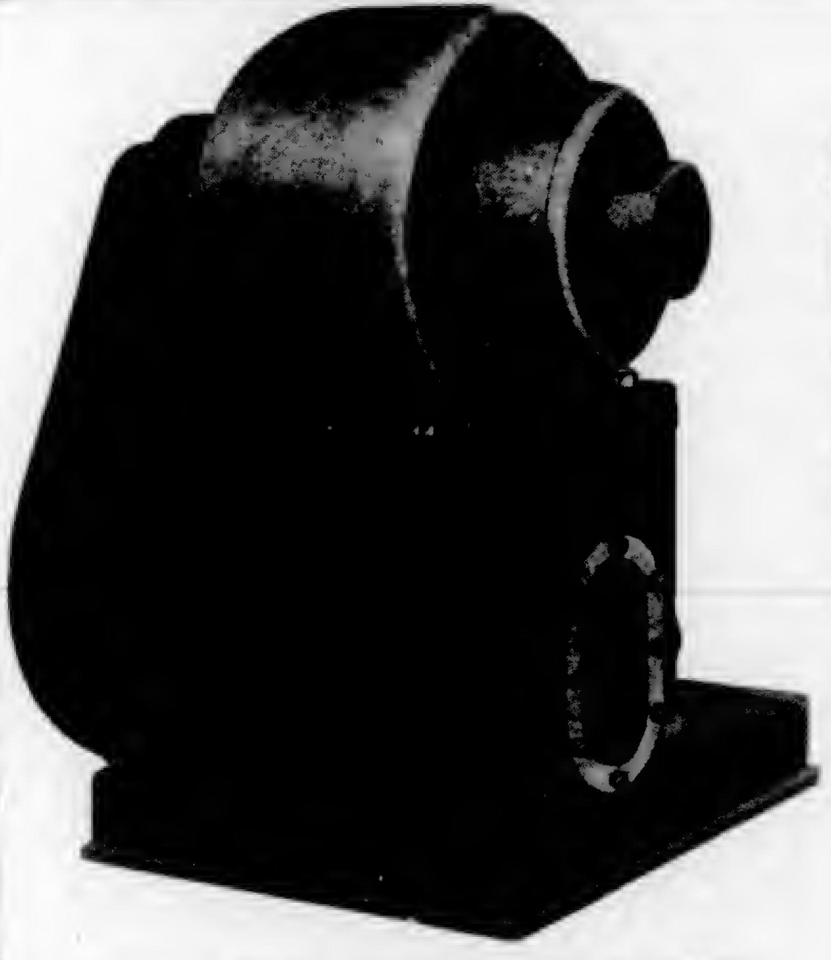
About Gas Furnaces

So great is the demand, and there are so many different kinds of this new method of hot air heaters (gas furnaces) on the market that the architect and owner is at a loss to recommend or decide which to use.

Where natural gas is to be had this would be a very simple matter, owing to the great heat produced and the fact that it will not rust or burn out and at the same time it costs less than manufactured gas. But on the Pacific Coast there is very little natural gas, and the life of the ordinary gas furnace is only one or two years. The usual deficiencies have all been overcome in the Sterling Gas Furnace by having all parts that come in direct contact with the gas fire made of cast iron and all other parts protected with a preparation that prevents rusting.

Another very important matter which makes the Sterling a success is the low cost of maintenance, which is made possible by utilizing all the heat in gas. The cast iron dome is three inches above the gas fire, where the greatest heat is produced, a feature that no other furnace on the market has, and within two minutes this dome will radiate a great heat causing a suction of fresh air to be drawn through the furnace and delivered into the rooms.

The Gas Furnace Co. of 226 Oak street, San Francisco, are installing and supplying the trade with the Sterling heaters.



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EQUIPMENTS (Standardized)

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Pacific States Telephone Co., Grand Hotel, Aronson Building, Robins Hotel, Williams Building, Boyd Estate, Hotel Arlington, The Empire Apartments, Hotel Leo, Marine Building, Union Square Building, Schmidt Building, Hillcrest Apartments, Duboce Apartments, Sherwood Block, San Francisco and the Imperial Hotel, San Jose.

BENNETT'S PETROLEUM
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579-581 HOWARD STREET, SAN FRANCISCO

Concrete Houses

"Competitive Designs for Concrete Houses at Moderate Cost," is the name of an interesting publication just issued by the Association of American Portland Cement Manufacturers, Land Title Building, Philadelphia, and is sold at $1.00 per copy.

It will be remembered that during the latter part of 1907, a prize competition was instituted by the Association of American Portland Cement Manufacturers, for the best plans of suburban concrete dwellings of moderate cost, the range being from $2,000 to $4,500.

The competition was under the direction of Edgar V. Seeler, Architect, and Sanford E. Thompson, Civil Engineer, and there were received some two hundred plans from architects in all parts of the United States. At the time of the award, some little publicity was given to the work done but in order to properly bring the matter to the attention of the public, the portfolio has been issued, containing all the plans to which prizes were awarded. Each plan is represented by a cut and line drawing, a ground plan, description and estimate of cost by the architect, followed by the comments made by the Jury of Award.

National Fireproofing Company

The National Fireproofing Company, which recently opened offices at Nos. 972 and 974 Monadnock building, San Francisco, has already taken quite a few good-size contracts. This company is well known throughout the country, having twenty-six factories and nearly as many offices in all the large cities.

The National Fireproofing Company manufactures terra cotta, hollow tile and are contractors for fireproofed building construction. The company claims to have fireproofed nearly ninety per cent of the famous sky-scrapers in this country. The new Taft-Pennoyer building in Oakland will be a fine example of their work.

Handsome Art Glass Windows

The San Francisco Art Glass Works has recently finished a very beautiful memorial window for the Epworth Methodist Episcopal church at Sanchez and Clipper streets, San Francisco. The design represents the Good Shepherd and has been set in columns which give the effect of beautiful onyx. The detail is brought out with remarkable realness. The window has been pronounced one of the best specimens of the art glass man's handicraft seen on the Coast in recent years. A photograph of it will be shown in the July Architect and Engineer. Other notable installations by Manager Johnston's company include two smaller windows in the same church, one of which is entitled "Come unto Me," and the other "Rock of Ages"; window in Trinity Lutheran church entitled "The Resurrection" and three in the Notre Dame convent. These three are exquisitely colored. They bear the titles: "The Madonna," "Christ at the River Jordan" and St. Joseph and the Child."

Meurer Bros. Busy

Meurer Bros. Company report a good demand for their Spanish tile and tin plates. This company is manufacturing a very fine grade of goods and architects who have specified their material say it is first class in every way. Recent contracts placed through the Pacific Coast agency, A. H. McDonald, manager, include orders for galvanized tiffany tile for covering the state building at Pullman, Wash., and an order for some goods to cover the Rosenburg hotel at Seattle, Wash.

PHOTOGRAPH OF WINDOW MADE BY
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Phone, Franklin 1588 San Francisco

FIREPROOF FIXTURES
FOR THE
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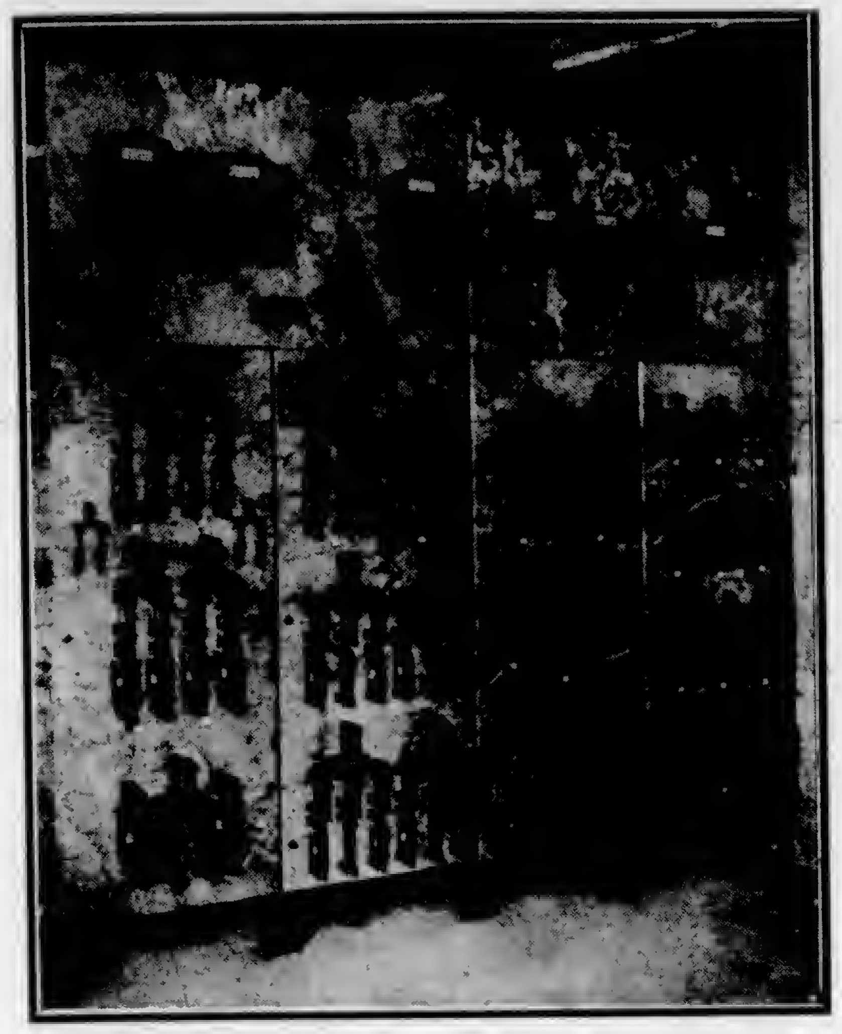
BUILDERS' ASSOCIATION, 96 Fulton St.

Occupies New Home

Few, indeed, were the firms in San Francisco that escaped the great fire and earthquake of April 18, 1906. The Butte Engineering Company, at that time with offices in the old Oceanic Steamship building at 327 Market street, was spared no more than any one else. The company lost practically everything.

Messrs. Paul C. Butte and Edwin B. Pike, both young men with abundant enterprise, were quick to anticipate the future and no time was lost in perfecting a strong organization. A third partner, Arthur B. Lebenbaum, was taken in, and on May 17, 1906, the company signed its first contract for work in the rebuilding of Greater San Francisco, although their temporary place of business at 884 Folsom street was not finished until June 1st.

Showing Conduit Work and Switchboards Installed in Elevator Room of the Pacific Bldg., San Francisco



Main Switchboard in Pacific Building

During these two years of dust and dirt the company has completed many installations, most notable of which were the Pacific building, Westbank building, M. A. Gunst building, M. J. Brandenstein warehouse and office, Bullock & Jones building, Koenig Shoe Company building, Silverberg Estate building, A. K. Realty Company building, Fillmore street arches, Olympic Club pumping apparatus, electric cranes for Dunham, Carrigan & Hayden Company, Fremont Iron Works, Tyler & Spotswood, Carr Foundry and Machine Works, Pacific Hardware and Steel Company, and many other jobs.

The Butte Engineering and Electric Company, after two years of success, have found it necessary to seek more commodious quarters, and to this end a building of its own has been put up at 683-85 Howard street, below Third street, San Francisco. The company moved in June 1st. The building is two stories and basement of brick construction and the first floor is devoted to the executive offices, engineering and drafting departments while the upper floor is especially constructed for the shop, pronounced one of the best equipped electrical shops on the Pacific Coast. It is devoted to the manufacture of switchboards, electric hoists, and "most anything that has a wire connected to it." In the basement is the stock-room where large quantities of conduit wire and electrical supplies are kept on hand for their own use.

The accompanying photographs show the switchboard built in the shops of the Butte Engineering and Electric Company and installed in the Pacific building; the other illustration shows some of their conduit work to the Otis elevator machinery in the pent house of the same building.

Removed to the Worcester Building

The Northwest Bridge Works (J. R. Bowles) has removed its office headquarters from 209 Stark street to 512-514 Worcester building, Portland, Ore. This is the firm that is to build the reinforced concrete bridge at Union avenue, across Sullivan's Gulch, and the bridge to span the gulch at East Twenty-eighth street. Preliminary work on the former is now in progress.

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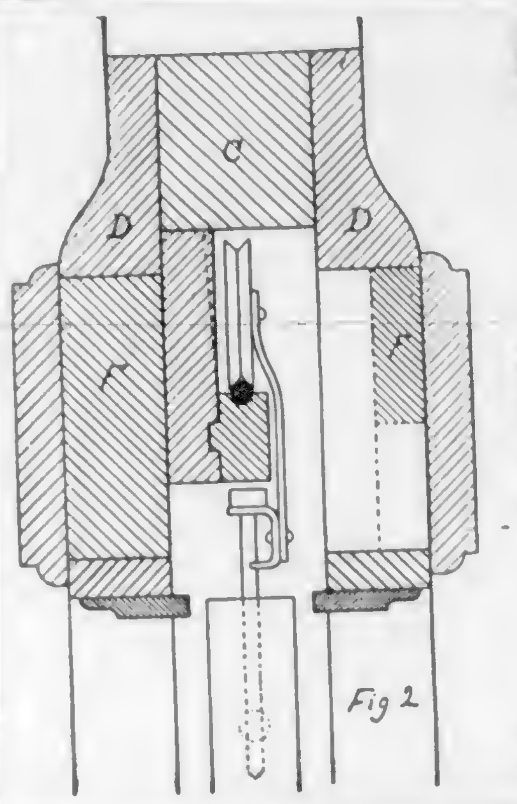

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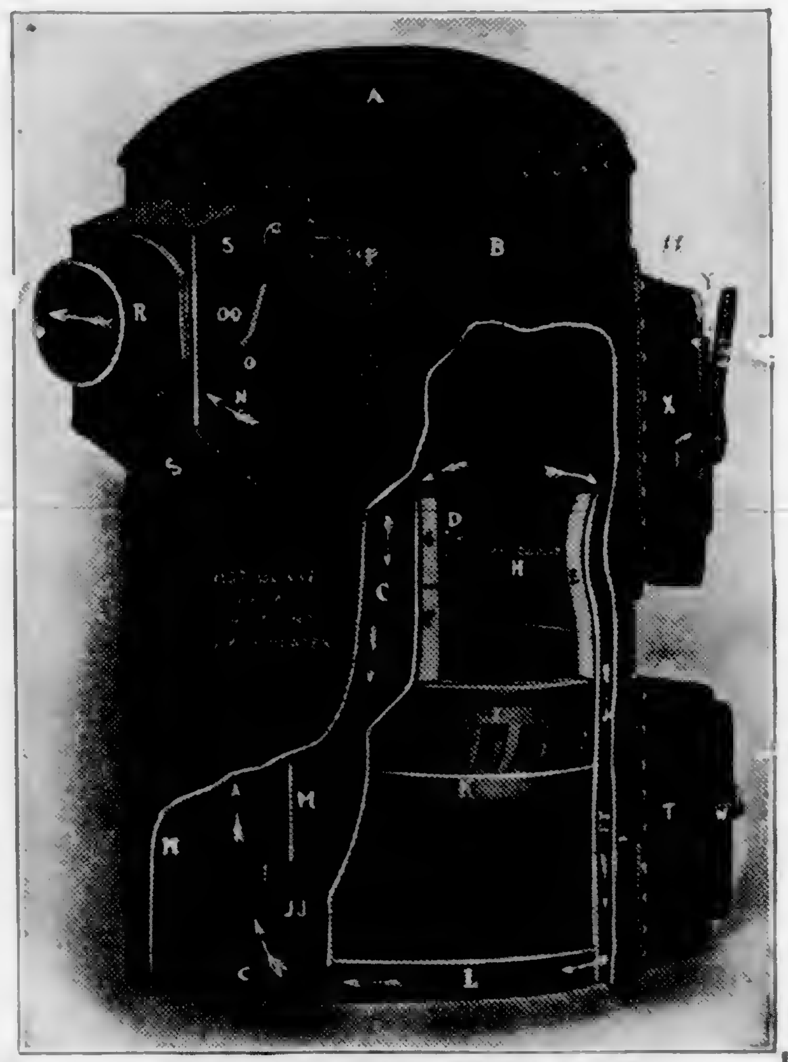

THE QUAKER FURNACE

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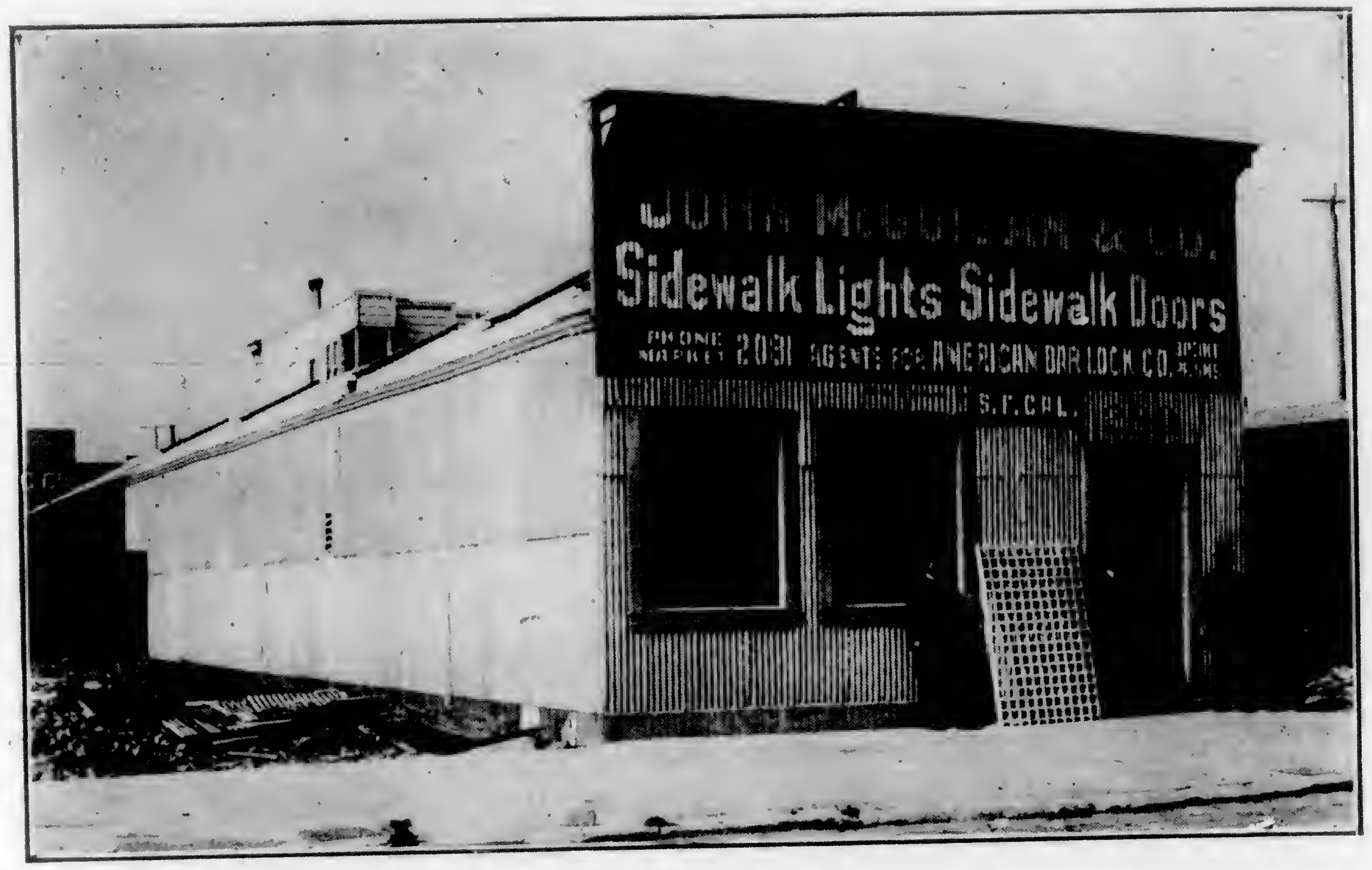

JOHN McGUIGAN & CO.
Sidewalk Lights Sidewalk Doors
PHONE MARKET 2081 AGENTS FOR AMERICAN BAR LOCK CO.
S.F. CAL.

New Home of John McGuigan & Co.

The illustration shown herewith gives the reader a good idea of the commodious new plant of the John McGuigan Company, at 280 Seventh street, San Francisco. This building was erected something less than a year ago when Mr. McGuigan assumed full charge of the sidewalk light business formerly conducted in partnership with Arthur Priddle.

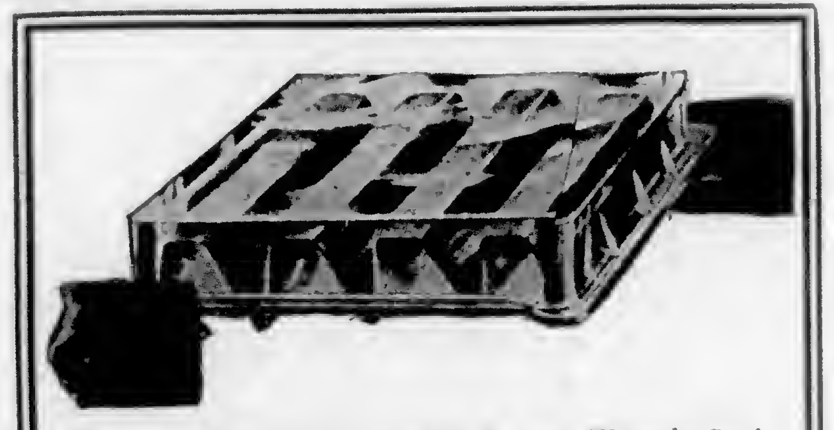
Mr. McGuigan is a veteran in the business and it is said of him that what he does not know of sidewalk lights and waterproof doors is not worth knowing.

Many of the principal buildings erected in San Francisco since the fire have been equipped with sidewalk lights manufactured by the McGuigan Company and architects and contractors who have used them are united in praising their good qualities.

One of the most important contracts taken recently by Mr. McGuigan calls for 4000 square feet of floor lights for the Emporium building. and which will be set in a porcelite white enamel frame—the first contract of the kind ever filled on the coast.

Under a New Name

About two years ago James E. Barker founded the business of the Portland Tile and Mantel Company. Subsequently an office was established at Seattle. Meanwhile, from a very modest and unpretentious beginning, the business has grown and prospered. Recently the original company was succeeded by the Barker Tile & Mantel Company, incorporated in California for $10,000. Its articles have also been filed in Portland. The officers of the new company are: James E. Barker, president; A. Schiller, vice-president; C. L. Dam, secretary; Crocker-Woolworth bank, San Francisco, treasurer. The Seattle office has been removed to San Francisco. The fact that a large amount of business for the company has grown up in San Francisco, made it essential that the company have a representative there.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WATERPROOF DOORS
REPRESENTING THE
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In Three Point Prisms
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The Parker Water Tube Boiler

The Keystone Boiler Works reports a steady increase in orders for the Parker water tube boiler. The Keystone Company are exclusive agents on the Pacific Coast for this well-known boiler, pronounced by experts one of the best on the market, not only because of its durable qualities but on account of its absolute safety and the fact that it is self-cleaning. The Keystone Company has one of the largest boiler shops in San Francisco, and there is good evidence of its business success in the statement that a full force of skilled mechanics has been kept busy almost without the loss of a single day since the fire. Details and price list of the Parker boiler will be furnished upon application. The main office and works are at Main and Folsom streets, San Francisco.

Successful Nevada Plant

The Empire Plaster Company have their office at Sixteenth and Harrison streets, San Francisco, and the manager, J. M. Curry, says that the plant, at which their hard wall plaster is manufactured, located at Empire, Nev., and equipped with the Grand Rapids machinery, has been materially enlarged and is turning out large quantities of plaster for the San Francisco market. The president of the company and principal owner is J. W. Adams of Carson, a former governor of Nevada. Besides handling the product of their factory, the company also sells the Blue Summit brand of lime from the Union Lime Company of Los Angeles.

Portland Architectural Firm

The latest addition to the rank and file of Portland, Ore., architects is Thomas M. Goodrich, of New York City. Mr. Goodrich has had wide experience in all the strenuous walks of his profession. The family is quite a remarkable one in the matter of architectural endeavor. The father, who died in Portland a year or more ago, was well known in the profession, and his sons followed in his footsteps. After the death of Mr. Goodrich, Sr., his son, C. L. Goodrich, continued the business established by his father, and, for a time, served as City Engineer of St. Johns. The business continued to increase, and now his brother, Thomas M. Goodrich, has joined him under the firm name of Goodrich & Goodrich.

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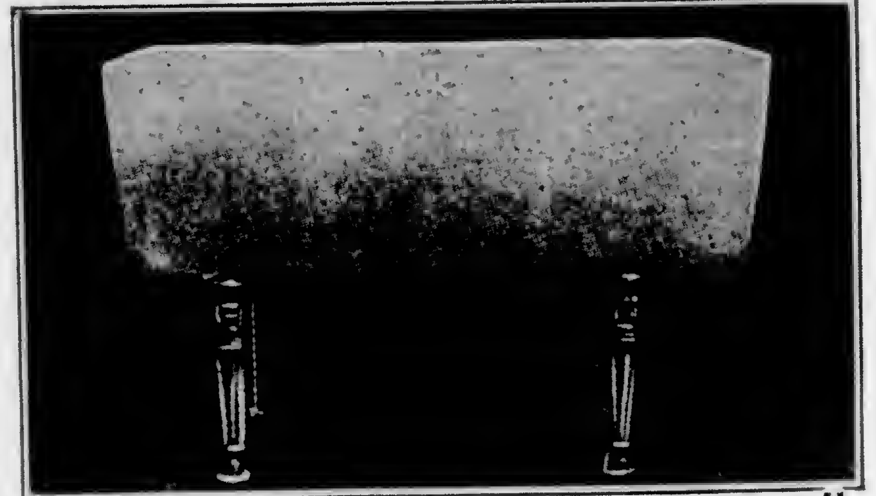

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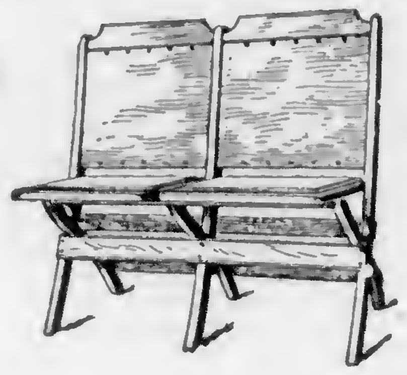

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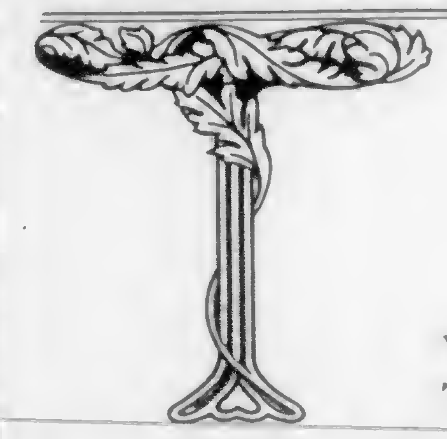

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Eastern Firms Established in San Francisco

The Willkomm Building Supply Company now has its offices with its warehouse at No. 151 Tehama street, near Third, and have added facilities for supplying materials and executing contracts in their various lines. A. Willkomm, the well-known building material dealer, is president of this new firm, which is incorporated under the laws of the States of New York and California.

During his recent trip East, in the early part of the year, Mr. Willkomm convinced a number of his principals that San Francisco offered an excellent field for business, and as a result the Willkomm Building Supply Company represents some of the largest and best known Eastern manufacturing companies. The American Luxfer Prism Company is in this combination, and their Mr. J. E. Dwan will personally attend to the matter of sidewalk lighting.

The Willkomm Building Supply Company are also agents for Asbestolith Fireproof Flooring and Wainscoting, Toch Brothers' R. I. W. damp-resisting paints and compounds, the New York Prism Co., the Union Fibre Company's Lith & Linofelt sound-deafeners, the New York Interlocking Tile Company's odorless rubber tile, the Acorn Natural Ventilator, the Duplex Filter, Winslow's Hydrolythic Coating for over-coming water-pressure, etc.

Special interest is attached to the lines of fireproof doors, windows and trim, which the new firm offers in a wide choice of design and finish; and also to their steel lockers and cabinets, offered at very low figures.

Wants to Help Concrete Block Industry

J. B. Foote, of the J. B. Foote Foundry Company, of Fredericktown, O., is making strenuous efforts to have a bill passed by the various State legislatures which will do much toward raising the concrete block in the esteem of the architect, builder and contractor. Mr. Foote realized some time ago that a great deal of the prejudice which exists in some sections of the country was caused by a lack of confidence, engendered by poor workmanship and carelessness on the part of the concrete operator. In order to correct this impression he conceived the idea that if a label could be pasted on each block manufactured, showing the date when manufactured, the proportion of cement and aggregate, the brand of cement and any other information regarding the same, anyone could tell at a glance just what he was getting and it would eliminate all danger of failures.

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"Quality Counts" in Building Material

The Western Builders' Supply Company of San Francisco has been incorporated with C. B. McCroskey, one of the founders of the old company, as president and manager; E. S. Kitchen, vice-president; A. E. McCrosky, treasurer, and J. W. Fost, secretary. The company has lately moved into well appointed quarters at 680 Mission street, east of Third. The executive officer's sales rooms and sample department are located here, while the old shop at Fourth and Natoma streets has been retained for warehouse purposes. All the members of the newly incorporated company are well known and popular and they have the well wishes of the trade.

Many lines of building material are carried by this company. Some of the more recent articles for which they have taken the coast agency being the Standard metal corner bead and "Like tile"—the latest enamel wainscoting which is to be had at half the price of metal tile.

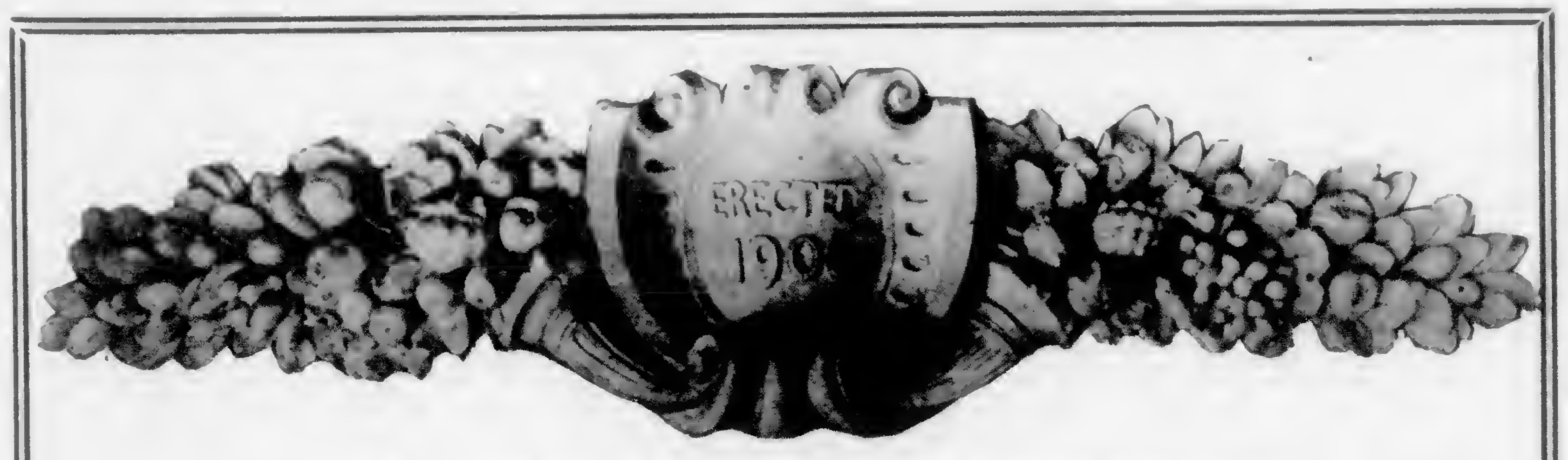
Other lines carried by the Western include capitals, brackets, art wood mouldings, carvings and grilles; ornamental iron, brass, bronze, etc., manufactured by L. Schreiber & Sons' Co., Cincinnati, Ohio; cement brackets, capitals, etc.; enametile for bath rooms, toilets, etc.; deadening felt, rubber floor tiling, asbestos sheathing paper; "Golden West" roofing; American concrete mixers, etc. "Quality Counts," is the company's slogan, and for more than a half dozen years it has lived up to it.

To Build Fine Warehouse

Long & Hoyt, the well-known San Francisco contractors, have recently taken the contract for the erection of a four-story brick warehouse building on Third street, between Brannan and Townsend streets, San Francisco, for Cyrus S. Wright at an estimated cost of $135,000. The building will be what is known as the mill type of construction and has been planned so as to obtain the lowest possible rate of insurance. It will contain 125,000 feet of floor space. It will have solid wood floors nine inches thick and they have been designed to carry a weight of 250 pounds per square foot. The first floor will be of concrete. The building will contain two elevators. It will be occupied by the Transcontinental Freight Company and will be one of the best built warehouses in San Francisco.

Building Note in 1923

In order to complete the 410th story of the Skyndicate building the contractors will have to raise the sky three or four feet.—Harper's Weekly.



A Clever Piece of Staff Work by Mr. Jurgewitz after Design by Stone & Smith, Architects

J. FRED JURGEWITZ
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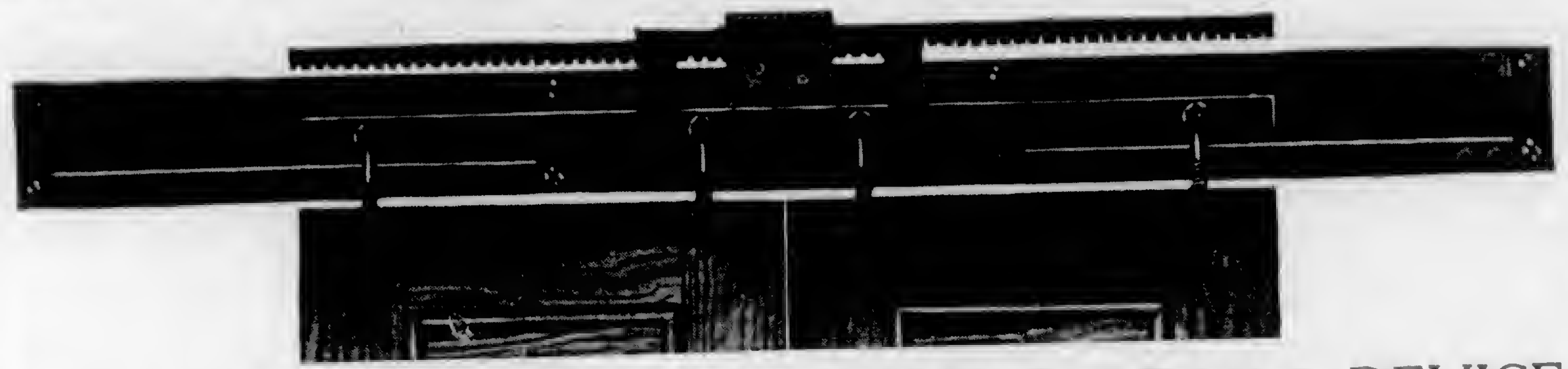

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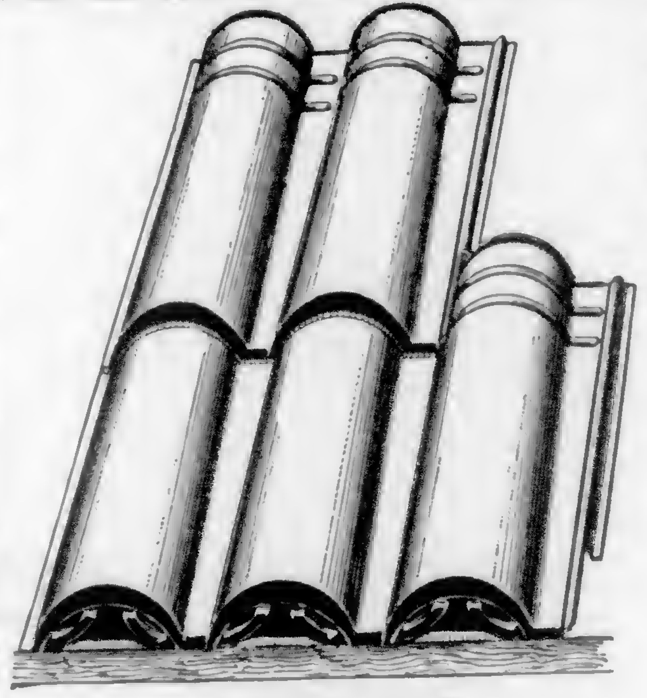

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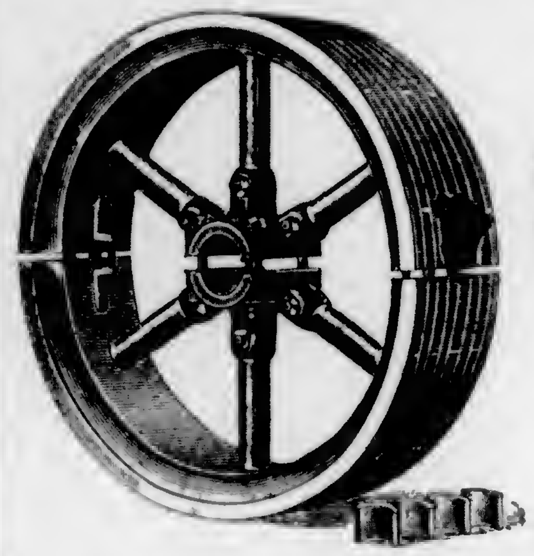

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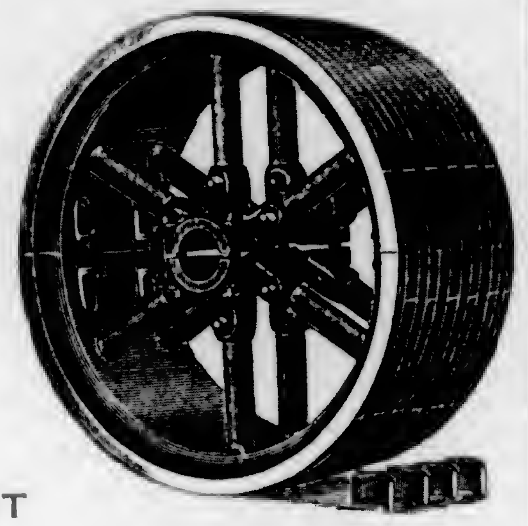

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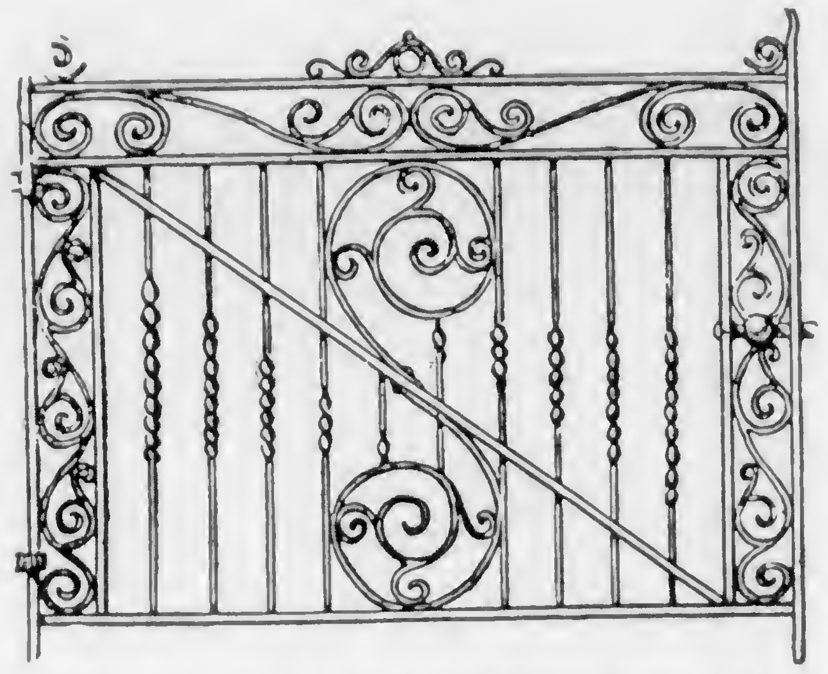
Change of Partnership

The firm of Lippert & Kelsey has been dissolved, W. L. Lippert, retiring. The new member of the firm is Leonard M. McEvoy, a young man of considerable experience and ability. The firm name will hereafter be McEvoy & Kelsey and the former quarters at 315 Howard street are retained. The firm are agents for the South Bend wood split pulleys with iron hub and iron bushing. They also handle freight elevators and hoists, second-hand boilers and machinery of all kinds. Their advertisement appears elsewhere in this issue of the Architect and Engineer.

Contract for Mahogany Bank Fixtures

The Fink & Schindler Company, of 226 Thirteenth street, San Francisco, have been awarded the contract for installing the mahogany bank fixtures and fittings for the United States National Bank at Dinuba, Cal., the cost estimated being $2500. Also for the First National Bank of Orosi, Cal. The fixtures are also mahogany and something siimlar to those installed at Dinuba. The plans and specifications for this artistic work were prepared by the Fink & Schindler Co.



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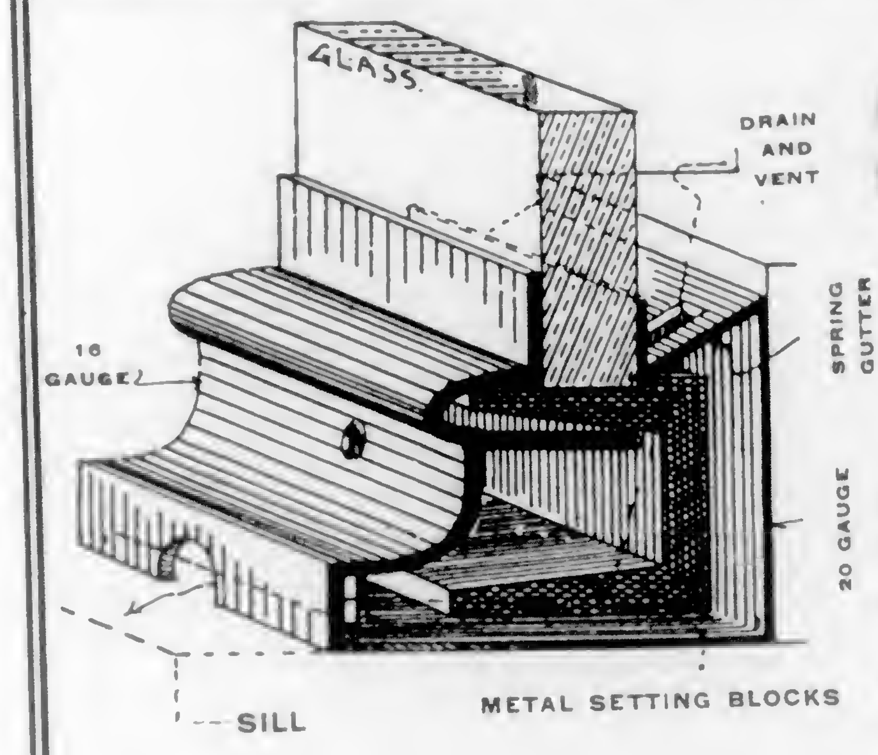

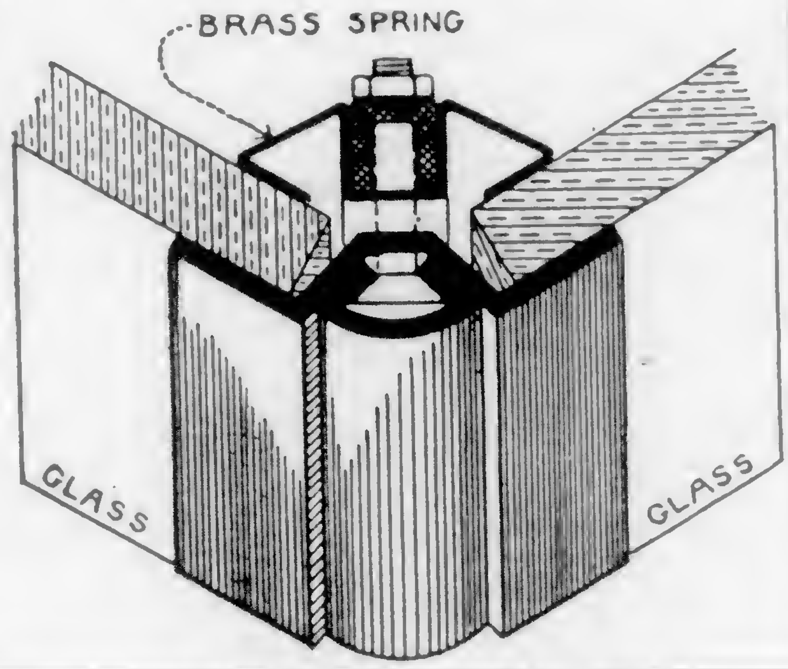

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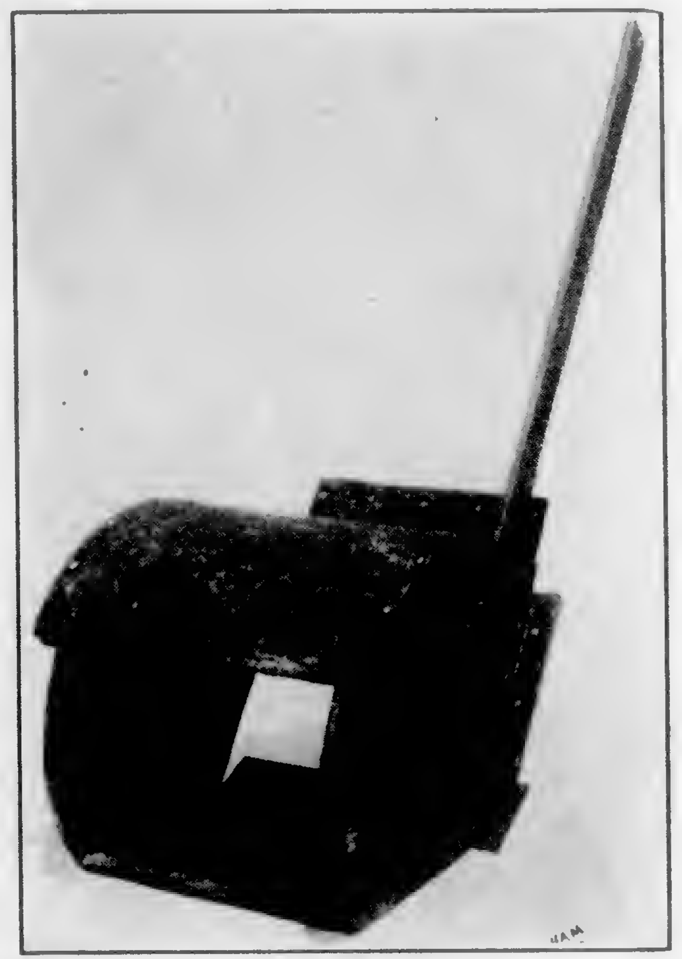

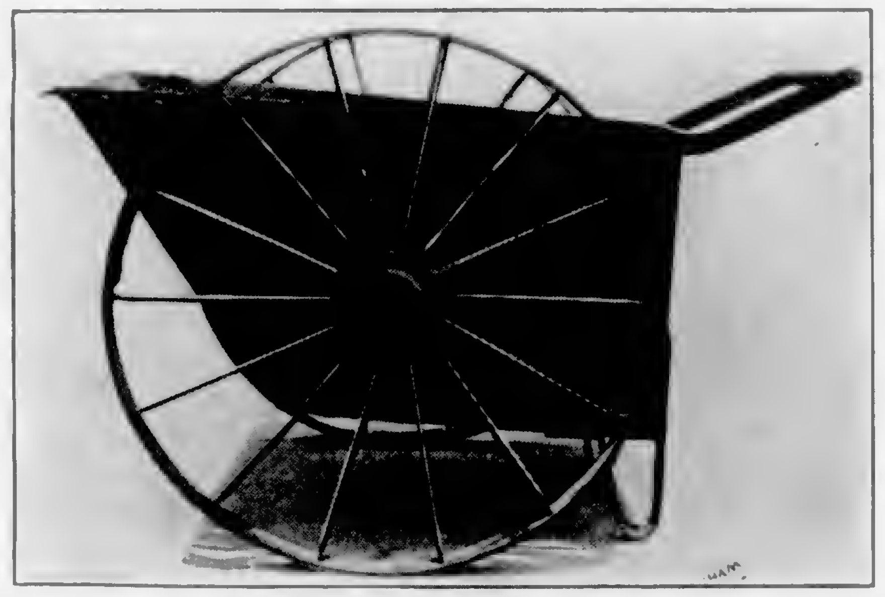

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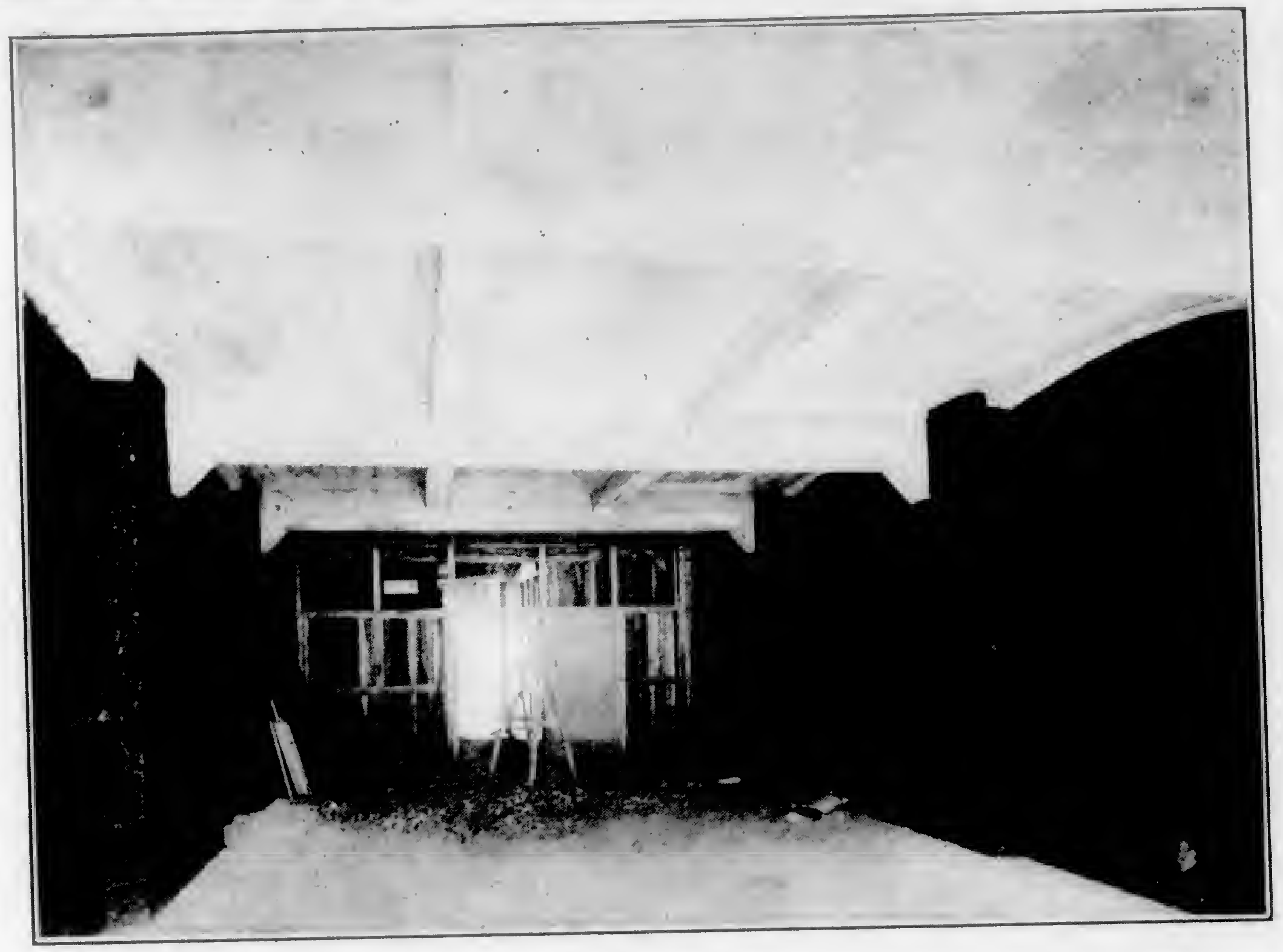
F. T. CROWE & CO., 121 So. Monroe St., Spokane, Wash.
F. T. CROWE & CO., Front and Ankeny Sts., Portland, Ore
J. COUGHLIN & CO., - - Vancouver, B. C.



McElroy Building, San Francisco. Brick Supporting Walls with Reinforced Concrete Floors
Wm. Curlett, Architect

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Oregon Sienna Mineral Paints

The Oregon Sienna Mineral Paint Company's mine is located near the Willamette river, in the southeastern part of Lane county, two miles west of Walker, a small town on the main line of the Southern Pacific Railroad. Here are sixty-two acres, under which lies "Sienna," the king of paint pigments.

A paint pigment when scientifically prepared makes an elastic paint, one that will not fade, crack, scale or blister; one that will stand the elements of weather.

This is the greatest Sienna paint mine in the world, and the only Sienna paint mine producing more than one natural color.

The Oregon Sienna Mineral Paint Company's mine produces forty-two natural shades, and by burning can make many more.

Oregon's Sienna shows the highest analysis in paint properties, as shown by Thomas Price & Son, analytical and consulting chemists, 509 Commercial street, San Francisco, California, gives as follows:

	Per Cent.
Silicon Dioxide	49.12
Ferric Oxide	12.02
Ferrous Oxide	2.53
Aluminum Oxide	14.12
Calcium Oxide	0.42
Magnesium Oxide	0.53
Water	20.18
Alkalies and loss	0.08
	100.00

In addition to the above a heat test has been made by the United States Government Engineers, the results of which are set forth in the following letter:

United States Geological Survey,
Department of the Interior,

Portland, Ore., August 5, 1905.

Oregon Sienna Mineral Paint Co., Salem, Oregon.

Gentlemen: I have been using one of your Sienna Paints as a ruddle for marking crucibles, scorifiers and cupels in my assay work. I find that it makes an excellent paint for this purpose, and can be heated to 1200 degrees-1300 degrees C. or from 2192 degrees-2372 degrees F. without burning off or changing color in the least. I take great pleasure in recommending it for use where subjected to high temperatures.

Yours truly,

FREDERICK W. HORTON,
In charge of U. S. G. S. Assay at Lewis and Clark Exposition.

In past years the Sienna of the world came from Tuscany, Italy, producing but one color, "yellow," when burnt changed to a reddish brown, known as "burnt Sienna." A few years ago a mine of like character was discovered in Pennsylvania, producing but one color, "yellow," and when burnt changed to a reddish brown. For years these two mines were all the world contained.

Statistics show that the greater volume

of Sienna used in America comes from Italy.

The latest United States Government reports of mineral resources show the production of Sienna in the United States as about 350,000 pounds.

The imports for the same year were 1,873,532 pounds, in the dry, and 1,387 pounds ground in oil.

Sienna is acknowledged everywhere as the best paint pigment known, but in the past it has been too expensive to use for general purposes owing to the cost of importation. But since the discovery of the great Oregon Sienna paint mines it is produced cheaper than lead or zinc, and has wearing qualities that are far superior to either. Besides all this Sienna paint is cheaper than any paint on the market.

Besides, the white lead paints are much less adhesive to the surfaces to which they are applied and have a marked tendency to blister or become chalky.

The Oregon Sienna Mineral Paint Company claim to make the nearest perfect paint that it is possible to produce, from the highest grade of Sienna, and the best quality linseed oil obtainable.

The output of the Oregon Sienna Mineral Paint Company's factory is handled by the Union Paint Company, who have their offices and warehouses at 114 Union avenue, Portland.

Reliance Door Hanger Company Comes to the Coast

Another enterprising Eastern house has established offices on the Pacific Coast with the intention of going after business here. H. L. Balch, secretary and treasurer of the Reliance Ball Bearing Door Hanger Company of New York City, recently made a flying trip to the Coast and arranged for the handling of the company's door hanger in San Francisco, Los Angeles, Portland and Seattle. Mr. Balch was enthusiastic in his praises of the Western country and he predicted a great future for San Francisco and, in fact, the entire coast.

Victor Dunkerley, with offices in the Monadnock building, will represent Mr. Balch's company in San Francisco. Louis R. Bedell, Bradbury building, will handle the hanger in Los Angelés and vicinity, while the Portland Iron Works and D. E. Fryer & Company will look after the interests of the company in Portland and Seattle respectively.

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Bungalows, Camps and Mountain Houses

The interest taken of late years by people of even moderate means to provide for a short season's rest in the country, woodside or on lake or seashore, has called forth much effort on the part of architects in all parts of the country to provide suitable abodes for such a season of rest.

In compiling this book the aim of its editor has been to bring together the best ideas, as far as possible, of architects who have given attention to this class of work. A glance through its pages will convince even the most sceptical that for a small sum of money such a summer home may be secured, with a large share of the conveniences of life and all housed in an artistic and beautiful manner. This is true of the summer home and is even more true of those houses adapted to the warm climates of California and the Southern states.

Most of the designs are photographs of houses actually built, and in most cases the plans are given, so that the work ranks above a mere collection of fancy sketches and has the advantage of representing what has actually been erected by architects who have given this subject their attention.

The book is printed on fine coated paper from excellent half-tones, and merits attention as a work of art as well as of practical suggestion. Published by W. T. Comstock, New York. Price, net, $2.

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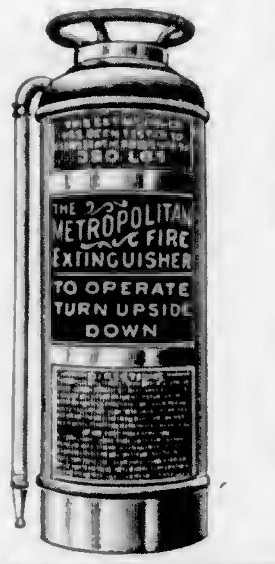
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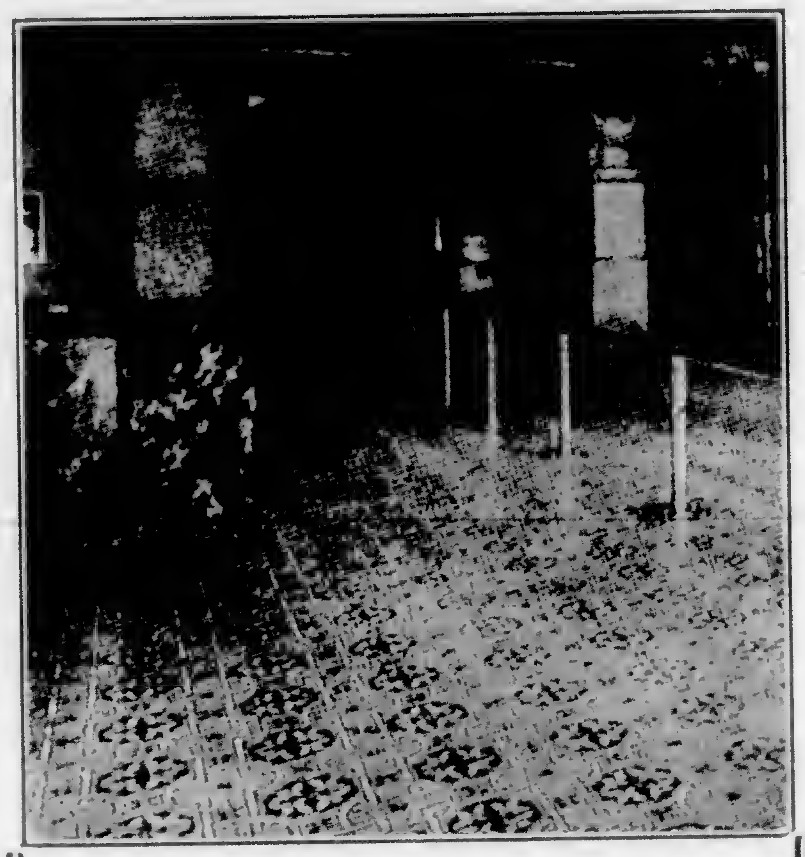

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Continental Fireproofing Company

The Continental Fireproofing Company, with offices in the Mutual Bank building, San Francisco, have lately taken a number of splendid contracts, including a schoolhouse, office building and several flats. The company is at present busy completing the fireproofing, hollow-tile partitions and terrazza flooring in the Koshland building, a seven-story structure at California and Market streets, San Francisco, designed by Architects Landsburg & Joseph; also the Richmond High School, three flats for Mrs. Eisenbach, and a flat for Mrs. Weil on Clay street, San Francisco, all designed by Architects Stone & Smith.

Other notable buildings completed by this company are the Overton and Occidental hotels and the Hahmond building, all at Santa Rosa, and of the reinforced concrete type of construction; the A. Leitz five-story building on Commercial street, San Francisco, designed by Architect Herman Barth; the Swett building on Mission street, San Francisco, both reinforced concrete; a three-story brick building at Post and Hyde streets, San Francisco, for the Norton Land Company; also Tulare County Court House at Visalia, Cal.

During the last week the company has been awarded a $40,000 contract for the complete erection of a three-story school building and also contract for the erection of a handsome residence at San Jose for Mrs. Hartman.

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The Watson Roof Company report a heavy business in their "Watsonite" flooring. Among the largest contracts recently completed are the Western Meat Company, 13,000 square feet; Wells-Fargo stables, 52,000 square feet; part of Wells-Fargo building, 10,000 square feet; Golden State Creamery, 2000 square feet; Dairy Delivery Company, 7000 square feet; National Packing Company, 10,000 square feet; South San Francisco Packing Company, 7000 square feet; J. P. Johnson's Packing House, 2500 square feet; California Glue Works, 2000 square feet; Acme Brewery, 10,000 square feet. A total of 115,000 square feet. Contracts have been signed also to lay "Watsonite" in Miller & Lux new abattoir, five stories, 70,000 square feet in all; also all six floors of Roebling & Sons' new building, a job of 92,000 square feet. This latter will be the severest test ever subjected to any floor, having to stand a constant pressure of 20,000 pounds per square foot. The brewery and packing-house people declare that "Watsonite" is the only flooring that will stand the wear, tear and all around hard usage and chemical actions so common in their respective line of business. Most of them have experimented with every kind of floor.

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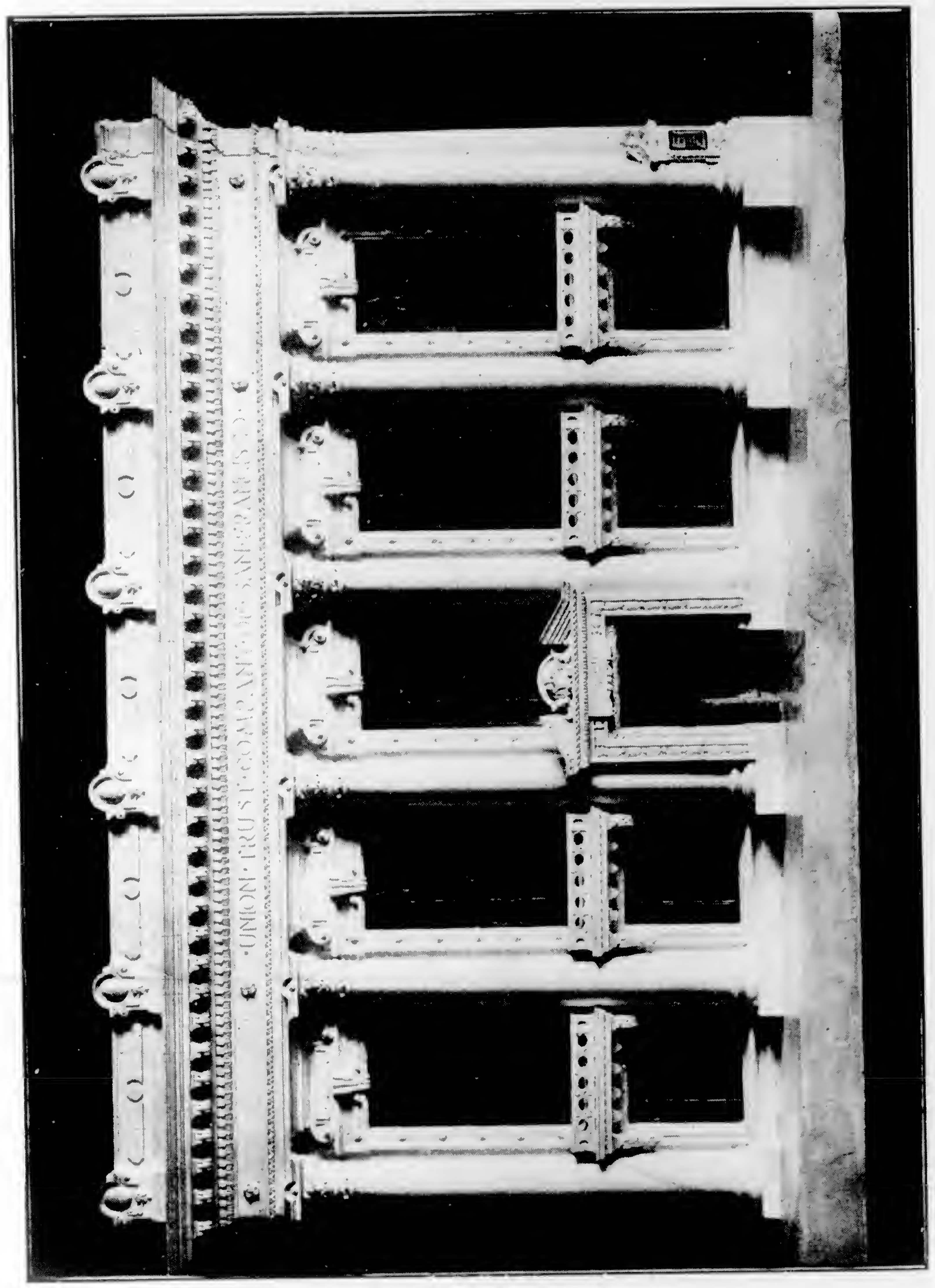
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Accepted Design of Building for the Union Trust Company
San Francisco
Clinton Day, Architect

Frontispiece
The Architect and Engineer of California
July, 1908

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Architect and Engineer
Of California
Pacific Coast States

VOL. XIII. JULY, 1908. No. 3.

A Strong Plea for Home Industry

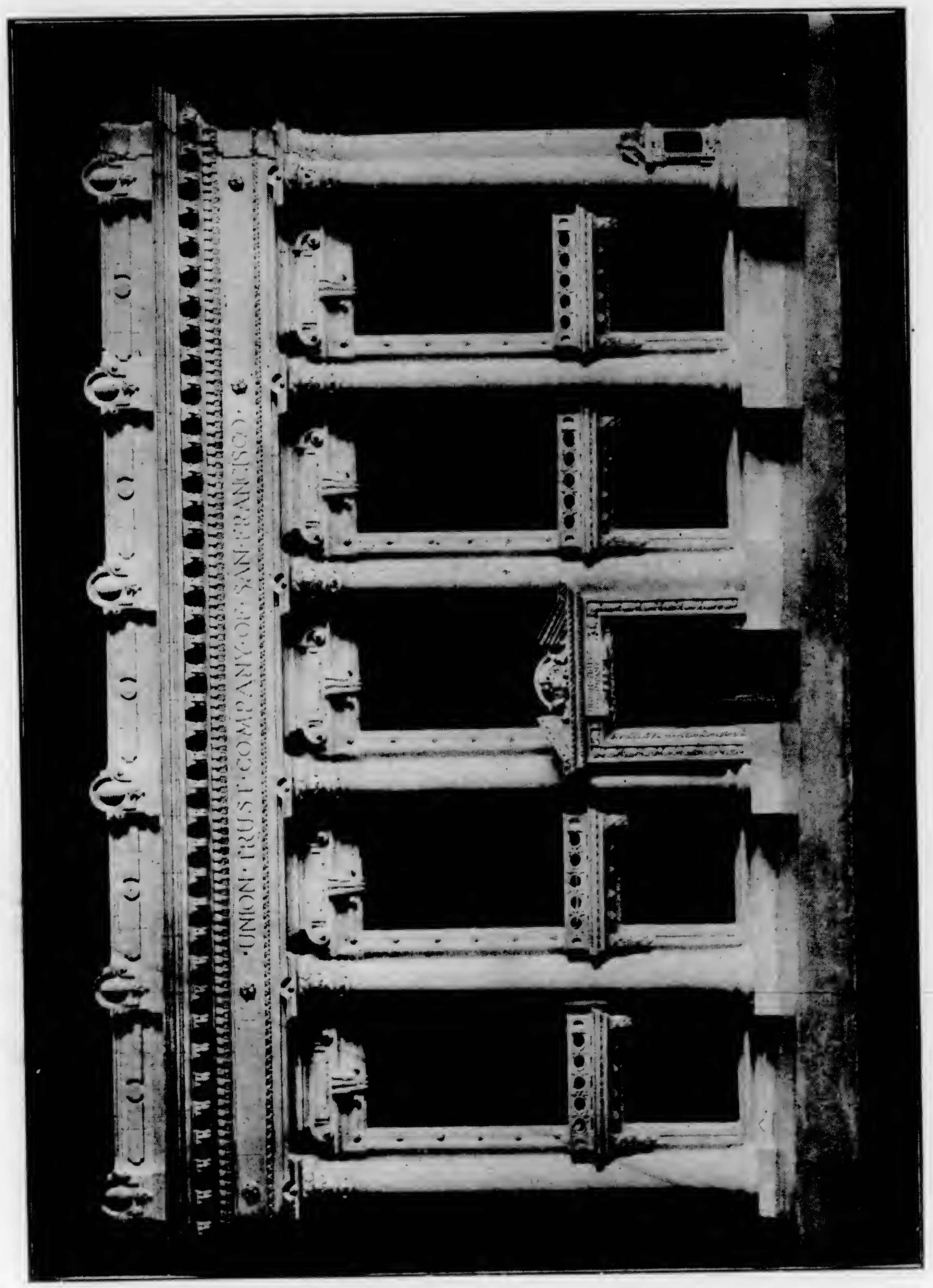
By H. W. KERRIGAN

RELATIVE to the campaign the Structural Steel and Ornamental Iron Branch of the California Metal Trades Association has inaugurated for home industry, it would be well to relate the conditions that brought about the present movement for home patronage, and in a brief way, to illustrate by what means the campaign is being conducted to obtain results and a logical way of co-operating with different interests of the city to bring about a closer affiliation of the architects, the contractors, manufacturers themselves, the property owners, the merchants, the different commercial bodies, civic bodies, all newspapers and periodicals and the general public.

Following the fire and earthquake in San Francisco two years ago there was dissolution everywhere—the natural consequence of the overwhelming disaster. Not only was the individual affected, but all the industries as well—the merchants and the property owners mostly, and the various organizations and commercial bodies also; in fact, everything and everybody was demoralized. It was a heterogeneous environment, but still something had to be done. No one was fit to organize or in condition, but the little they did do was to clear away part of the debris. Every one was for him or herself—and who could blame them at the time? Building commenced, temporary shacks were erected and in one or two cases larger buildings. Then, as some confidence returned, more buildings were erected.

All this time the few plants that were left and poorly equipped, and others that were not equipped at all as a result of the fire, accepted contracts that they were practically forced to accept by the overwhelming demand for building. Plans were accepted and forced upon the structural steel and ornamental iron foundries from the architects that they really could not attend to and finish in time. Everyone that could wield a hammer or drive a nail was pressed into service. An indiscriminate mass of workmen drifted in, as did various others in the building trade—architects and contractors, taking advantage of the chaotic conditions that prevailed, with the result that the work was poorly done in the rush of things and the architects blamed for the result.

They had no alternative but to throw the responsibility back on the structural steel, the ornamental iron, the cement, the terra cotta and all others in the building line who were criticised and still are being judged in the same light as they were seven, eight and ten months ago. In a way, one cannot blame the architect in his judgment of conditions that were, but he must realize that the inefficiency of the workmen that drifted in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They had no alternative but to throw the responsibility back on the structural steel, the ornamental iron, the cement, the terra cotta and all others in the building line who were criticised and still are being judged in the same light as they were seven, eight and ten months ago. In a way, one cannot blame the architect in his judgment of conditions that were, but he must realize that the inefficiency of the workmen that drifted in and were pressed into service brought about such poor results in contract work and in some cases these workmen are still here.

Finally, the financial depression came along and building was at a standstill. Contracts were coming in slowly and finally no building at all. This gave the various industries a chance to get their breath again after the rush of building and then it was found that the mechanics were not as efficient as they could have been. This necessitated a general cleaning up and segregation of the good mechanic from the bad, resulting in good for the employer. Then they also found that their equipment was not as it should be, and as building had gradually recommenced, the building trades began to see the incongruity of their position. But in the meantime, judging from the disorganized state of the city and the inadequacy of the different shops, the architects and contractors began sending East for structural steel and ornamental iron and still are doing so.

Realizing the conditions that existed, the Structural Steel and Ornamental Iron Branch of the California Metal Trades Association, to keep up with the modern tendency for building, there being such a demand for steel and iron, were the first to improve their shop conditions; modern machinery was installed, new foundries were erected and the plants rebuilt and made larger with greater capacity than ever before.

We found upon investigation that at least 75 per cent of the structural steel contracts were being let to Eastern firms, not only in our lines is this true, but in other lines as well; so, to remedy what we could of this industrial suicide to our plants, if such were kept up, we have inaugurated a strong campaign for home industry, appealing to every commercial body in the city, architects, property owners, contractors, corporations, newspapers, periodicals and the general public to do their utmost to keep the structural steel and ornamental iron here. That we are succeeding in securing some co-operation of the people and organizations like the Chamber of Commerce, Merchants' Association, Merchants' Exchange, Manufacturers and Producers' Association, Builders' Association and the Builders' Exchange, is quite evident by the recognition already received.

That they have met in joint conference and decided to leave all work of publicity and soliciting for greater affiliation and progress, to the writer, is all very well in a small way, but it is not sufficient co-operation and effort. We are far from our goal. There are many obstacles to overcome. This campaign must be made more public; more organizations must take up the work; but the individual more than any one.

Every home manufacturer when he advertises, must mention home industry. Let that be the slogan. For not only do the present conditions affect the various manufacturers, but the entire city. Every one is affected more or less and should interest himself in a personal solicitation of the work of an earlier rehabilitation of our city, and in no better way can this be brought about than to hasten co-operation for home patronage. That the papers have given us space in this effort is the best sign of all, for they can see the necessity of such a campaign; and that they will give us more has been promised if everyone will help provide ways and means to further the work so successfully commenced.

Let any one figure the contracts that are going out and compare them with just that much money going out of the city as a result. Do the various industries, the property owners, the owners of buildings, the banks, the merchants and occupants of buildings, the real estate men and corporations, the labor unions, who can improve conditions if they will, the different mechanics, and the city itself, realize what could be done if the money that is leaving the city could be kept at home?

When you see such flagrant examples of corporations and architects, contractors and property owners sending steel and iron work East, as they do every day or so, it is time to ponder, especially when we positively know we can do the same work here if given the opportunity which we don't get in the majority of cases.

For instance, I will cite a few cases that could have been left here and could be easily handled by our plants where we have been the lowest bidders in some cases and in some higher by a few dollars but should have been given the preference just the same. The steel is the same, the quality of work is the same and the workmen are the same as those of the Eastern firms; and still these contracts have been sent East: Maskey's building, the Graff Estate building, the Berkeley Library and the Emma Rose building, all of these being steel. This you will note only represents the iron and steel industries in local building, in itself amounting to millions, and how many more millions can we estimate when other lines of building and manufacturers are affected in like manner, affecting the mechanic as well with no work to be had, many of whom have mortgaged their property to get money to live on while out of work.

In our line alone it is a fact that out of over 600 bridge and structural iron workers there are only a little over 100 employed, and in the housesmiths and architectural iron workers, who have a membership in this city of about 2,000 there are about 600 working; sheet metal workers, out of 700, about 250 are working. This is what we are doing by allowing so much work to leave the city.

It really cannot be intentional, it must be misunderstanding; people do not realize the conditions as they are. Still, with these many endeavors to keep work here we do not wish to keep competition out, but we must strengthen ourselves first to compete with the East when competition does come.

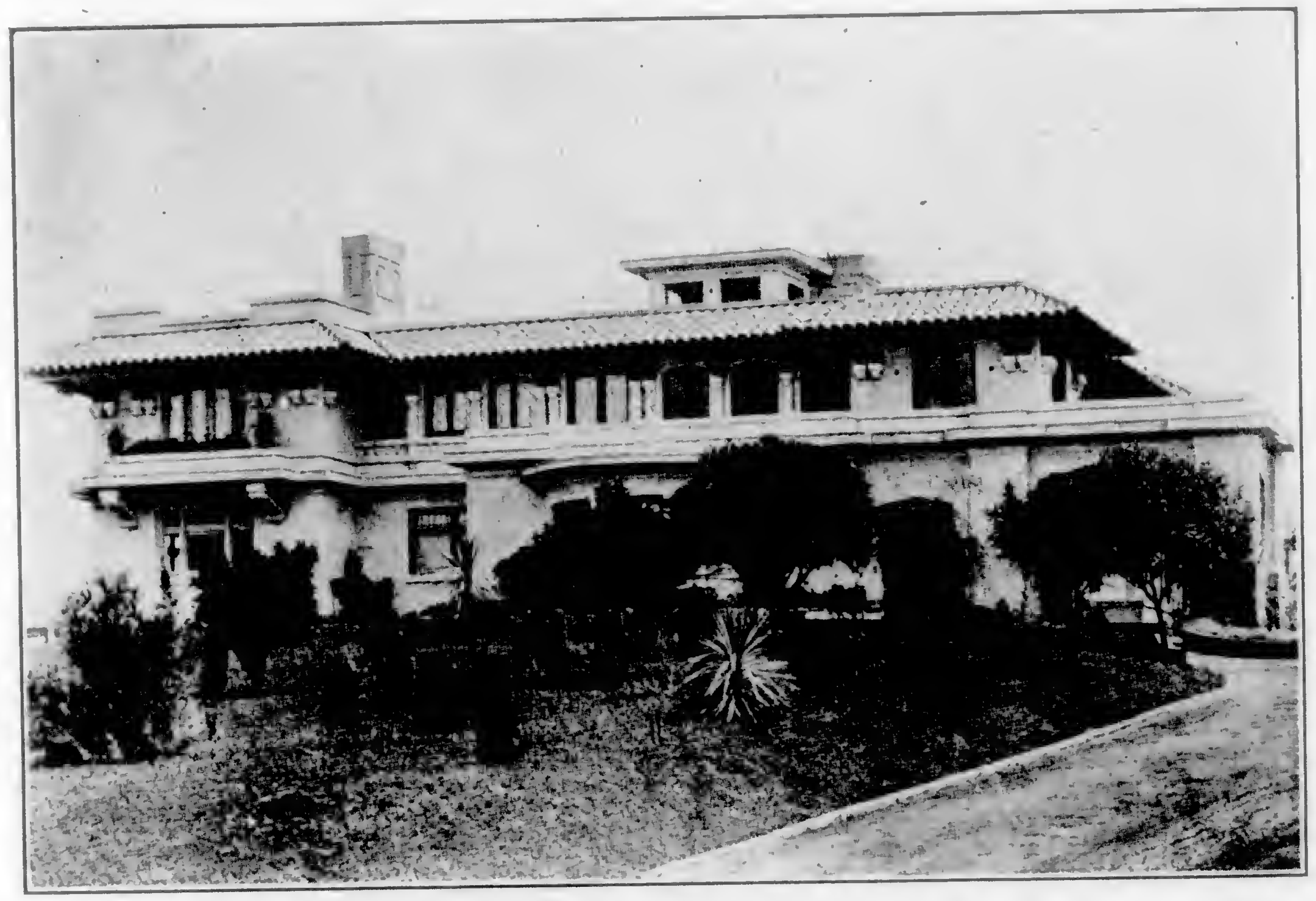
Though the city is slowly readjusting itself it can do better work if instead of making the city many small cities in themselves, to make it one large organized city with the business interests concentrated in one downtown district, instead of the business being distributed in every part of town, each a town of itself, fighting for itself rather than as a unit working for closer co-operation and affiliation to one definite purpose.

It is an absolute fact that the merchants on Van Ness avenue at the present time who had leases for another year, fearing that the business may move to a more central part, are petitioning the other business people on the avenue to stay there for another year, and so with Fillmore: instead of helping with the rehabilitation of the downtown district that logically and geographically should be centralized, and which they are holding back for selfish reasons. So it is with every individual and business man in the entire city. Will the results come that they are looking for, if they do not pull together in one homogeneous enviroment, instead of fighting an individual fight in every section of the city? No, assuredly not. And yet they are blindly going ahead in their own way to try and develop themselves. Surely that isn't the real San Francisco spirit! Something must be done, and the quickest way to bring it about is to get together in a business and social way in a more harmonious whole, rather than one disorganized mass of humanity, for a more sane rehabilitation of our city.

* * *

The foreman that stays closest to the job gets the best work done.

A FIRE-PROOF HOUSE
OF
Terra-Cotta Blocks and Cement Finish



House of Edwin Bergstrom, Architect, Los Angeles
John Parkinson and Edwin Bergstrom, Architects

Progress Work. House of Edwin Bergstrom, Los Angeles
John Parkinson and Edwin Bergstrom, Architects

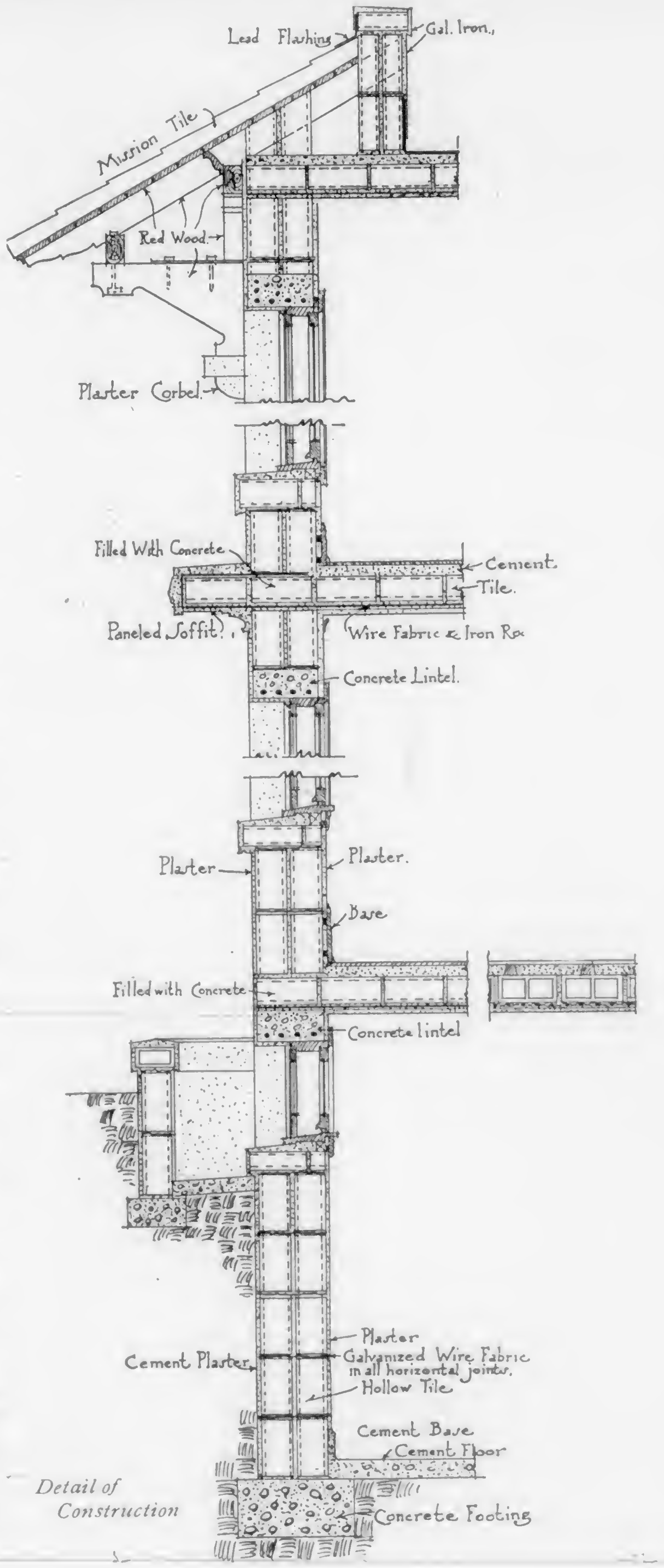
A Fireproof Country House of Terra-Cotta Blocks

A RECENT issue of The Brick Builder contains an interesting description of the new home of Architect Edwin Bergstrom of the firm of Parkinson & Bergstrom, Los Angeles. The house is built of terra cotta blocks with cement finish and is believed to be fireproof.

The property on which the house stands—some two acres—is bounded by three streets, and located on a hill sufficiently high to give a commanding view from the first-story windows of the entire surrounding country. The north view is of the Sierra Madre mountains, to the west lie the Santa Monica hills and the Pacific ocean, to the south and east, the city of Los Angeles, with the island of Catalina in the distance. These views determined the location of the principal rooms, and command of the magnificent sweep of country made the roof garden desirable.

The main idea was to obtain a house particularly adapted to the California climate, with its sudden variations between the hot mid-day and the cool nights; also, a house that would be cool during the summer and warm during the rainy season. For these reasons, terra-cotta tile construction with a finish of cement was determined upon. This insured a fireproof, vermin-proof and sound-proof house, and one which the architect believes will stand any shock that a building can be expected to stand.

The walls, floors, roof, and the structural parts throughout are tile and cement, the only woodwork used being in the trim and floor surfaces. The cornice and roof projections are carried out in the natural colors of the red tile and redwood.



Detail of Construction

Lead Flashing
Gal. Iron.
Mission Tile
Red Wood.
Plaster Corbel.
Filled With Concrete.
Cement.
Tile.
Paneled Soffit.
Wire Fabric & Iron Ro
Concrete Lintel.
Plaster
Plaster.
Base
Filled with Concrete
Concrete lintel
Plaster
Cement Plaster
Galvanized Wire Fabric in all horizontal joints.
Hollow Tile
Cement Base
Cement Floor
Concrete Footing

The exterior walls, from footings to roof, are built of two thicknesses of six-inch tile, resting on concrete footings. The interior walls and partitions are of four and six-inch tile. All tile walls have galvanized wire fabric in the horizontal joints. The floors and roof are constructed according to the Johnson Tension System. The lintels over all openings, both interior and exterior, are of reinforced concrete. The exterior is plastered with a first coat of cement applied directly on the tile, and a second coat of waterproof plaster with fine stippled surface. The roof and piazzas on the second floor were first finished with cement, and then covered with Malthoid, making them thoroughly water-tight.

The interior plaster was applied directly to the tile. The roof, of Mission tiles, is supported on redwood brackets and timbers, and forms an awning which protects the second story windows from the direct rays of the sun during the middle of the day. No steel is used for construction except as a tension material.

The principal chambers of the house have fireplaces, and open upon piazzas planned to serve as open-air sleeping rooms.

The house is heated by hot air forced into the rooms by rotary fans, and this system is so arranged that the furnace is disconnected during hot weather, and the fans blow cool air into the rooms.

Clay tiles have been used liberally for wainscoting the floors in the billiard room, bath rooms, kitchen and service rooms.

* * *

The Artistic Expression of Concrete*

By A. O. ELZNER, F. A. I. A.

THE mere contemplation of this subject so large in its scope and as yet so little exploited, makes a writer feel like a traveler in a new land: to know where to begin and where to end: whether to follow the line of least resistance and make it a mere review of accomplished results, or taking courage, to strike out boldly, discover motives, express opinions, and generally lay down the law.

The one course would scarcely be appropriate here, because it requires no combined effort. The other course is full of danger and if pursued alone would consume too much time and invite too much criticism for comfort. Let us, therefore, take moderately of each and see whether we cannot make of this dissertation a monolithic concrete structure, with a mixture of one part good fellowship, thoroughly seasoned and tested according to the Institute Standard, two parts clean, sharp sand and four parts unscreened crushed hopes and ideals, with a three per cent reinforcement of illustrations taken from anywhere and everywhere.

After all, our subject, large as it may seem, really rests upon a very few fundamental principles, which, like the issues of a political campaign, must be repeated over and over again if we can ever hope to drive them home.

Above all, this discussion should properly be confined to concrete used structurally, having in view the possibilities of a constructive architecture rather than the development of sculptural decoration. Proceeding upon this basis, we may at once eliminate all consideration of concrete blocks and artificial stone, inasmuch as these products, being mere substitutes for brick and stone, and being used in the same manner, do not alter the status of our art, but leave it just what it has been from the beginning, a gravity architecture, if this term may be used.

The great antiquity of concrete as a building material would justify a search for early examples of its use in architectural expression. But apparently this remarkable material, which, after all, is only just beginning to reveal its ultimate possibilities, was used by the ancients only for the baser purposes of piling up masses of masonry, or at best as a backing for stone and marble facings. The first suggestion of its fitness for artistic expression came when builders undertook to construct architectural features of cement mortar.

There is undoubtedly a great fascination in being able to mould a thoroughly plastic material as cement mortar into any desirable form, or even to shape it by hand, while still soft, and so produce creditable work of decorative sculpture. But one invariably suffers a shock upon discovering that beautiful, stately colonnades or arcades and porticoes, well designed and in style, are not built of stone, but that we are looking at a thin veneer of cement mortar, in short, that they are a horrible sham.

During this period of development, while architects were being led to adopt new materials, they did not concern themselves with the evolution of design in conformity with their new materials, and it followed quite naturally that no progress was being made toward the realization of a concrete architecture. In fact no attempt was apparently made in this direction.

It would be difficult to estimate the power or extent of Ruskin's influence in bringing about a restoration of truthfulness in design. While it cannot be said to have extensively effected immediate and tangible results, it did not set men to thinking, and it is only in recent years, within the present generation in fact, that this subtle influence is gradually asserting itself, and naturally bringing about a revival of real artistic inspiration.

It is hard to depart from beaten paths, and men, as a rule, will not and dare not, until some genius boldly cuts a new way. It is hard to give up the old familiar forms that have become a veritable architectural alphabet, which seems to most of us entirely sufficient for the expression of our ideals. And now that we have entered upon an area of concrete construction, and that, too, with a suddenness and determination that is thoroughly and typically American, we cannot reasonably expect designers to throw aside all tradition and make for a new style. That will take time. Nevertheless they are gradually coming to recognize in concrete a material that will afford abundant opportunity for originality and individuality, and, accordingly, bold excursions have been made into the new field with creditable results.

In looking about for inspiration, we may turn to a number of sources. There are, for instance, the oriental mosques with their picturesque domes and minarets, or the aristocratic old palaces of India, so full of suggestions of all kinds.

But above all, we cannot well resist the inspiration of the charming Spanish missions of the Pacific Coast countries. Here we find an architecture, which, though not of concrete, strongly suggests the same in its simple treatment of wall surfaces and openings. The designers of these charming buildings were fearless in departing from traditions. They frankly recognized the limitations of available materials, and, working as they did, under the greatest possible disadvantages, succeeded because they studied the possibilities and logical adaptation of their material.

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*Paper read before the 41st Annual Convention of the American Institute of Architects at Chicago, November 19, 1907.

Fortified as they were with the true principles of art, in which they were thoroughly grounded, they produced practically a new style, which, however, sacrificed nothing of quiet dignity and repose, and avoided the eccentricities and pitfalls of L'Art Moderne or Nuvean Art. Such is the spirit which should possess and guide the designer of concrete today.

Concrete, as it is used in superstructures, being the only kind which we are considering, should be mixed by machine to produce the best results. This, however, cannot be economically done unless large quantities can be used without serious interruption; it follows naturally that such a structure is more or less perfectly monolithic, and at once this characteristic becomes the dominant note of the situation. Monolithic is freedom of joints or even semblance of joints. This is the fundamental idea that should be impressed on our concrete designs. To accomplish this successfully, we should endeavor to treat wall surfaces in masses as large as possible. They need not necessarily be kept entirely plain, although this would depend upon the nature of the design. In cottage work and small buildings generally, and to some extent in more ambitious work, such large plain surfaces are perfectly delightful, especially when given a rough finish. This can be accomplished in various ways, and here let us be technical for a few minutes.

First of all the concrete may be left just as it comes from the moulds. In this case the aggregate should be quite small, not over one-half inch, and the mix should have the minimum allowance of water, making what is called a dry mix. In doing this, however, there is great danger of the wall not being waterproof, so that if possible, such a mix should be used directly against the forms for surface work only, and the balance of the wall made of wetter, richer mix and of fair thickness that will prove sufficient to be waterproof; or else this rich concrete may be used throughout and the forms removed before the final set, and the skin of the concrete removed with water and a good stiff wire brush, or with acid.

Then again the concrete may be allowed to get good and hard and the surface tooled off.

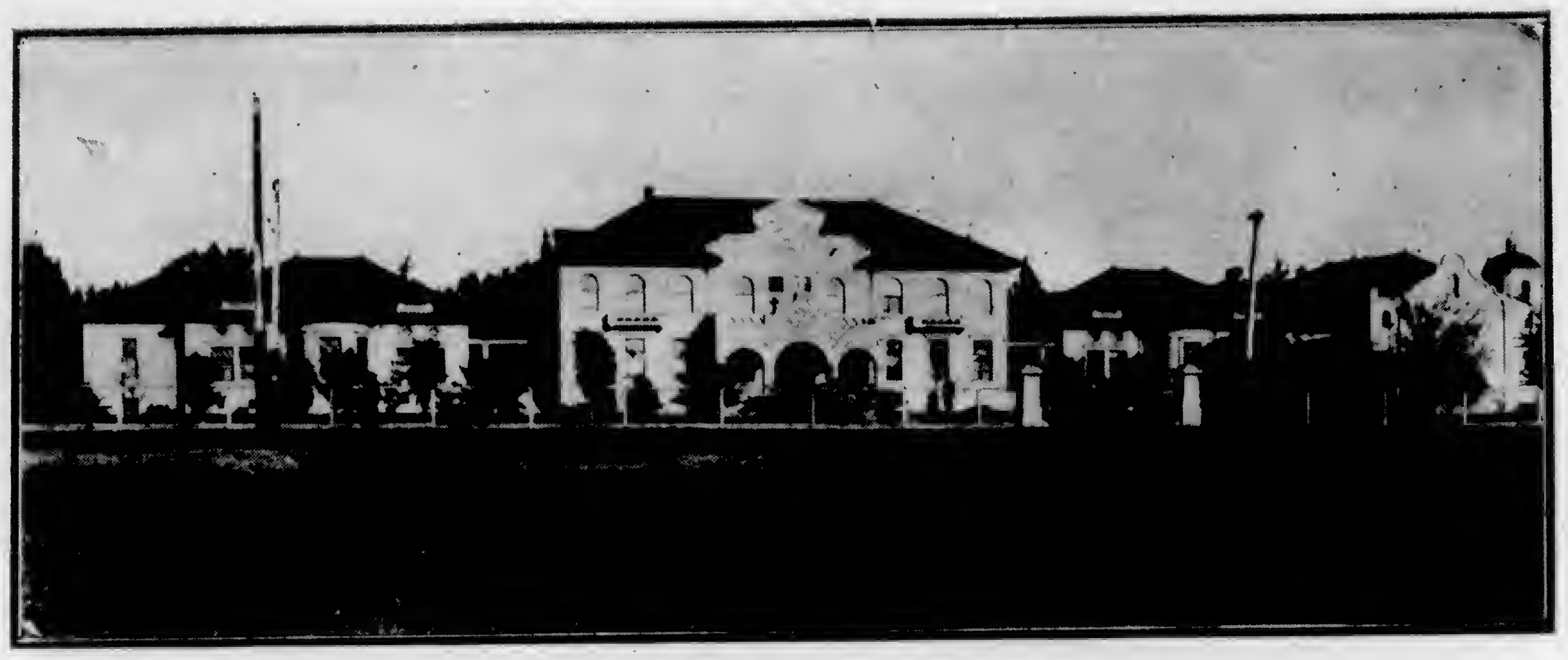
But with all such treatments there is always the danger, as first indicated, of having a damp wall, especially where it is not very thick, as is apt to be the case with reinforced concrete. Practical consideration, however, must finally prevail, lest the unfortunate architect's life be made miserable by the complaining client, who, naturally expects, and is entitled to a dry wall. Under such conditions, it is therefore advisable to plaster the concrete wall with a good coat of water-proof mortar and give this a rough finish by the various methods at hand, such as brooming or floating with a rough carpet covered float, or stippling, or pebble-dashing, or splatter-dashing, all of which methods are commonly understood.

The fresh mortar thus applied may be modeled by hand, producing some simple ornamental design, naturally in low relief.

Advocates of Polychromatic Architecture, too, have here splendid opportunities of using tile or faience which may be incorporated in the surface with telling effect, provided that it is used sparingly, and entirely as a subordinate, so as to emphasize the character of the concrete and enhance its beauty and effectiveness.

In large massive work, the surface may be broken by raised or sunken effects, such as panels or ornaments, cast directly in the concrete by applying reverse moulds on the inner surface of the form work.

Cornices and band-courses, or other simple architectural features, may be fashioned in a similar manner.



St. Joseph's Home, Stockton, Cal. Walter King, Architect

Some of the Work of Walter King, Architect

SOME of the work of Architect Walter King of Stockton is shown this month and it speaks well of the ability of Mr. King, who is a rising member of his profession. The illustrations shown include two or three quite pretentious office buildings and some very creditable residences. Several good examples of the California bungalow are also shown. Mr. King was formerly in the office of the late architect, Page Brown, in San Francisco, and his work is a testimonial of the careful schooling which he received under this versatile tutor. The Pierce residence is really a charming piece of French architecture, while the St. Joseph's Home illustrates the possibility of the Mission style. Mr. King has been practicing in Stockton for the past six years.

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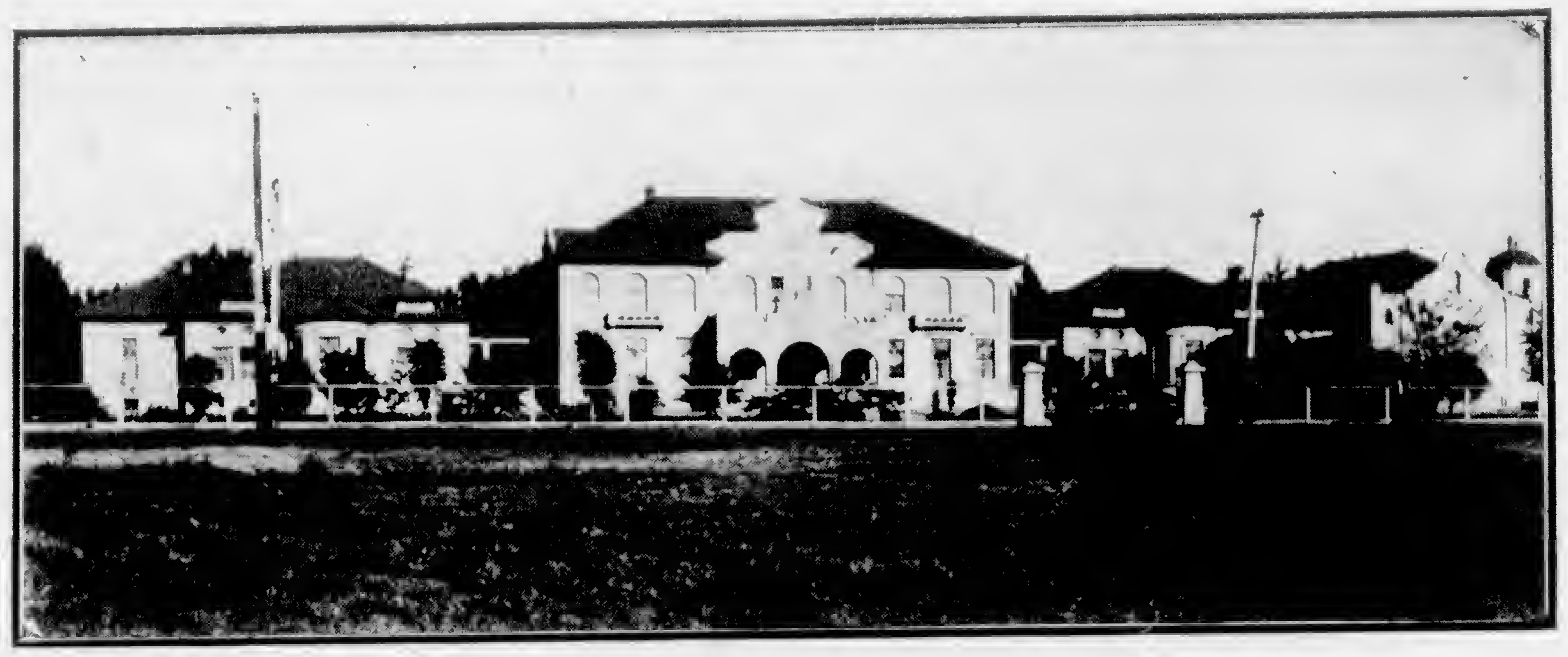

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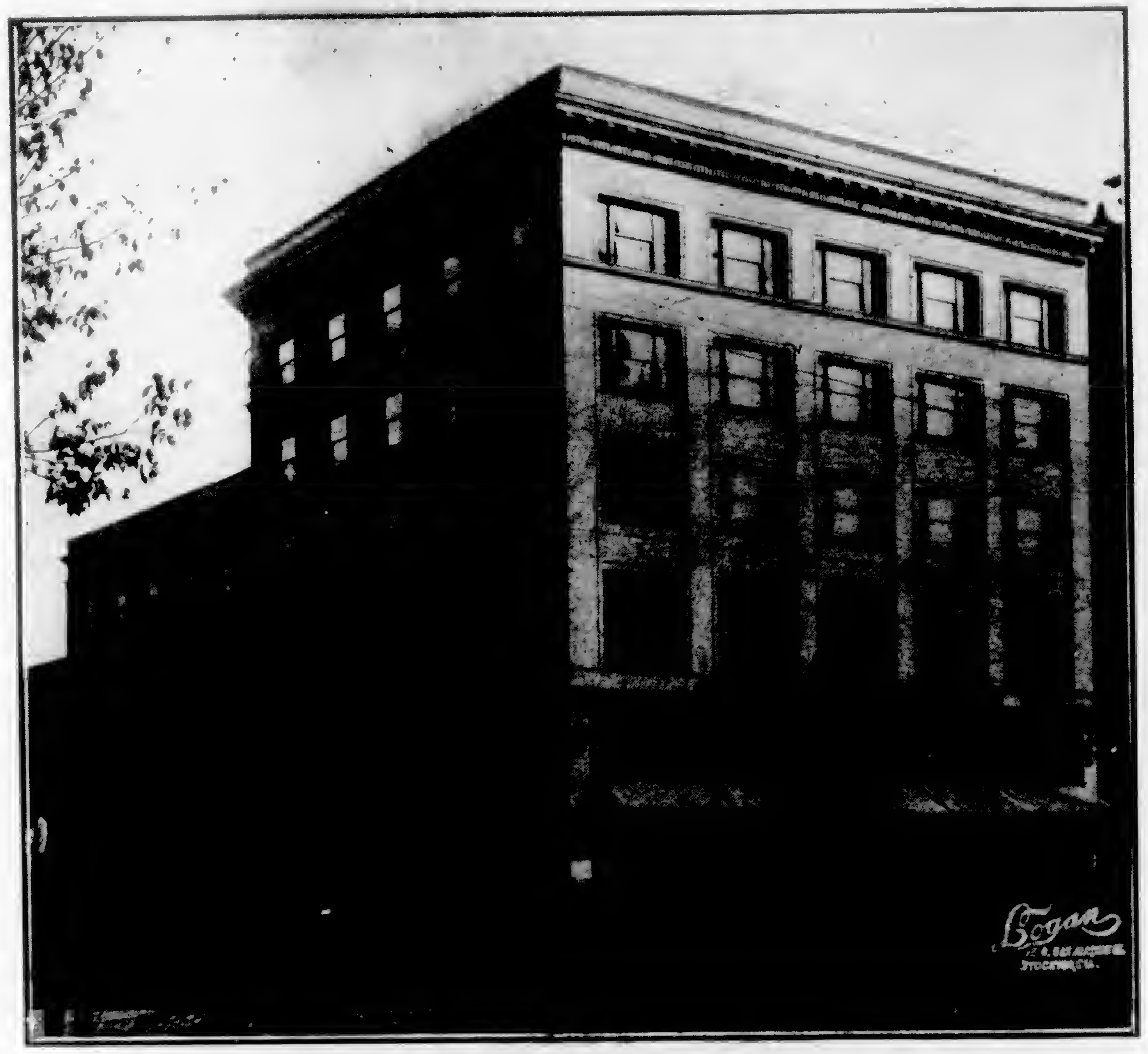
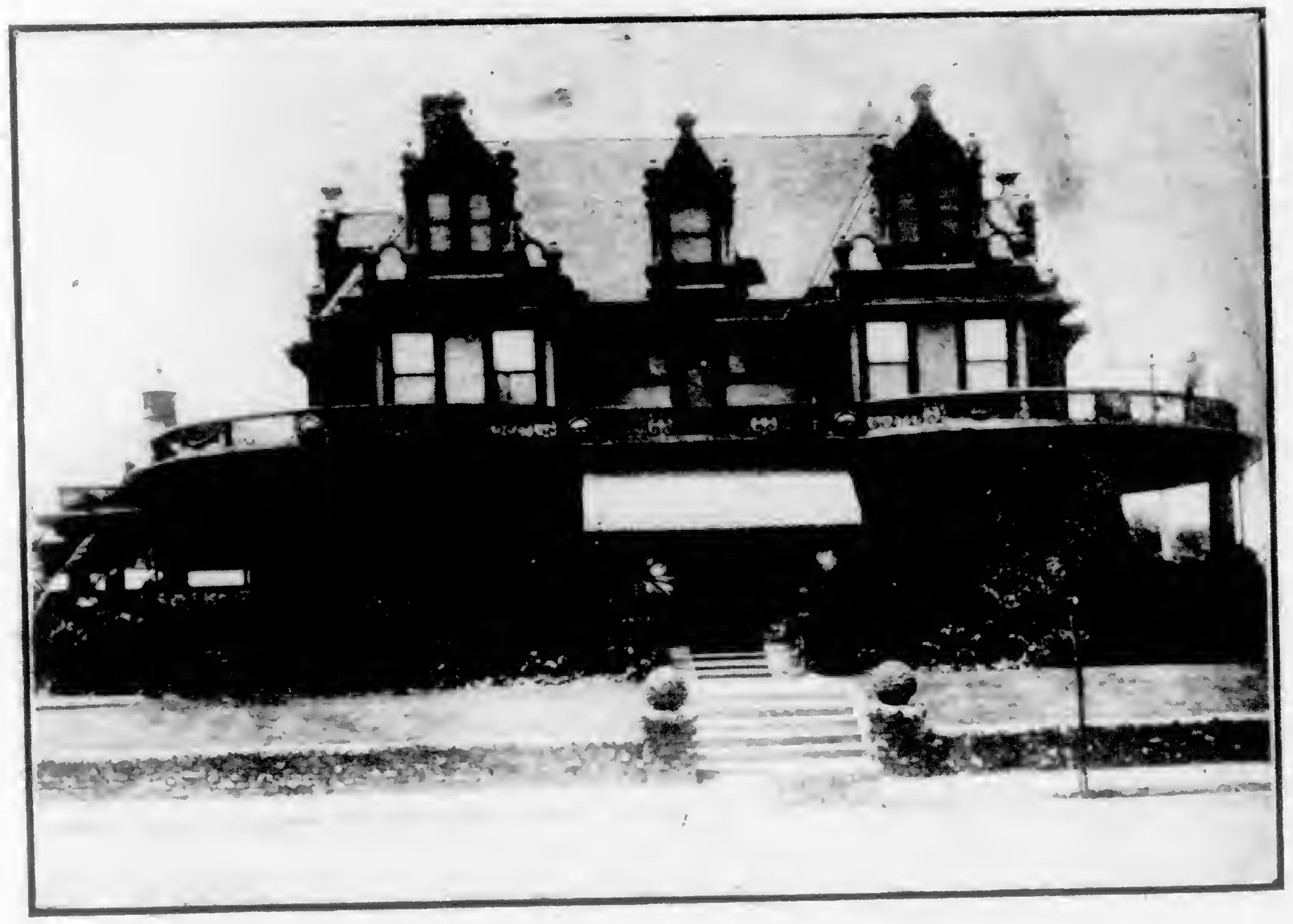
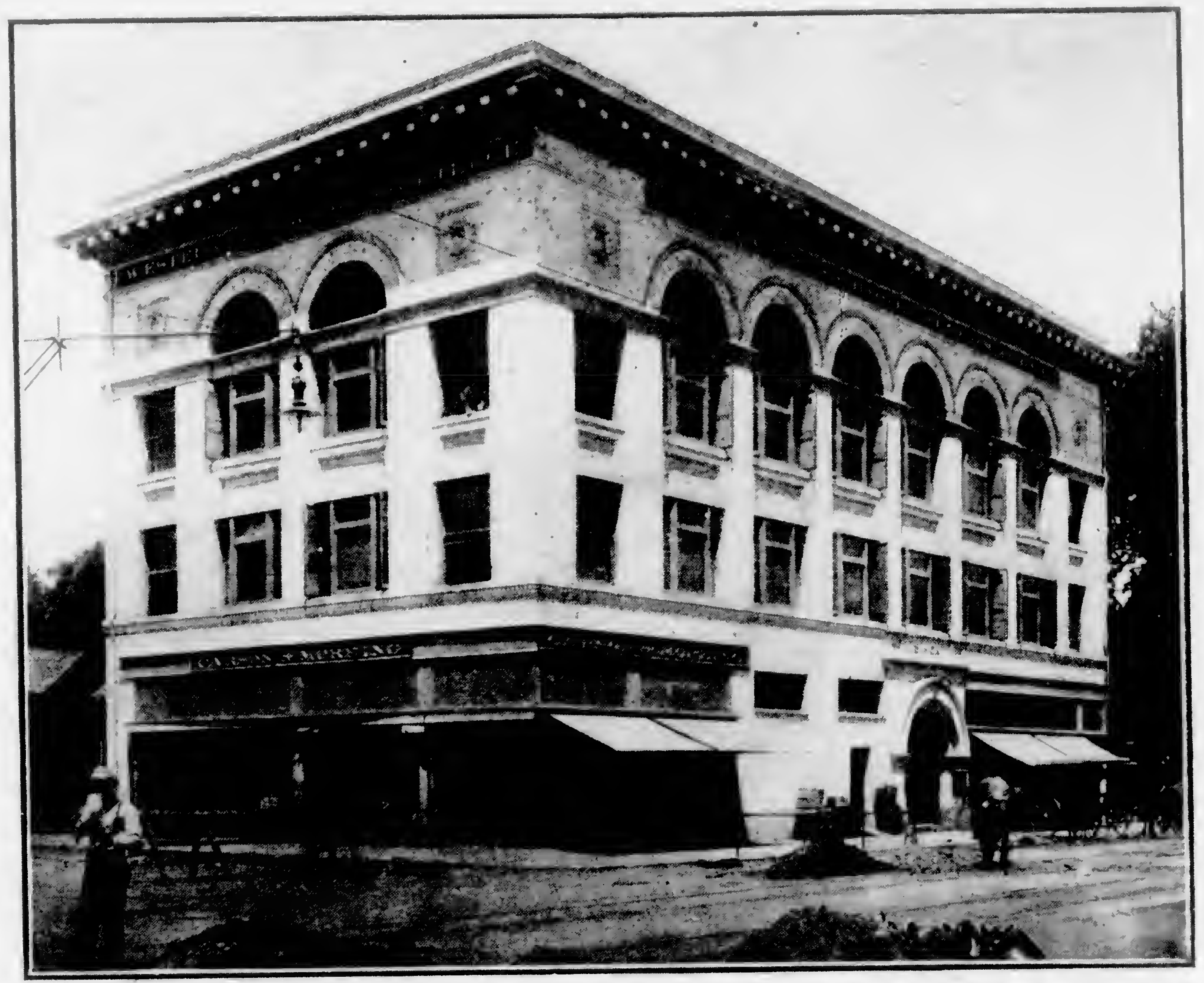


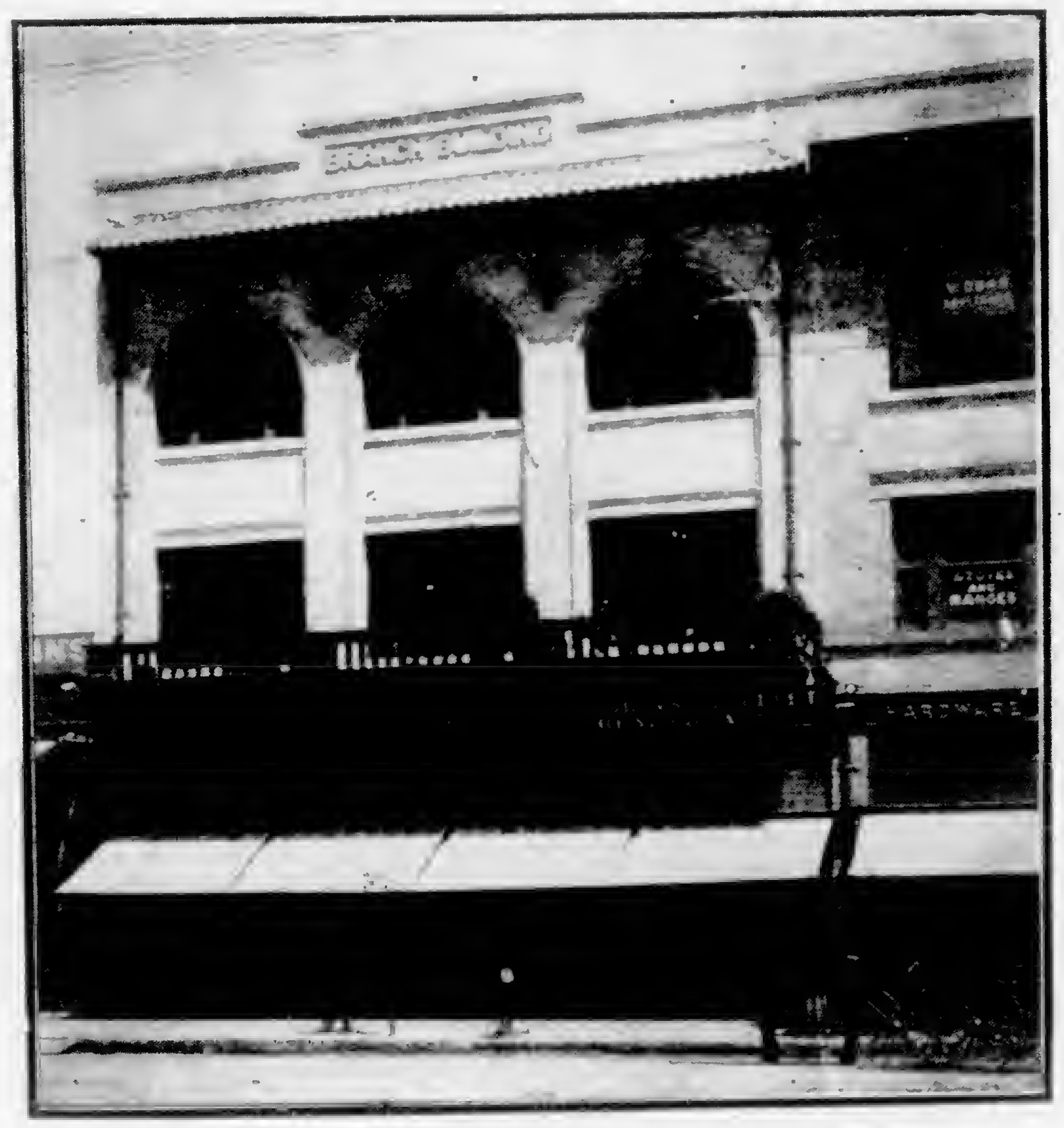
The John Breuner Building, Stockton, Cal.
Walter King, Architect



Residence of Mr. Charles Pierce, Stockton, Cal.
Walter King, Architect



Simon Building, Stockton, Cal.
Walter King, Architect T. D. Lewis, Contractor



Branch Building, Stockton, Cal.
Walter King, Architect

The John Breuner Building, Stockton, Cal.
Walter King, Architect

Residence of Mr. Charles Pierce, Stockton, Cal.
Walter King, Architect

Simon Building, Stockton, Cal.
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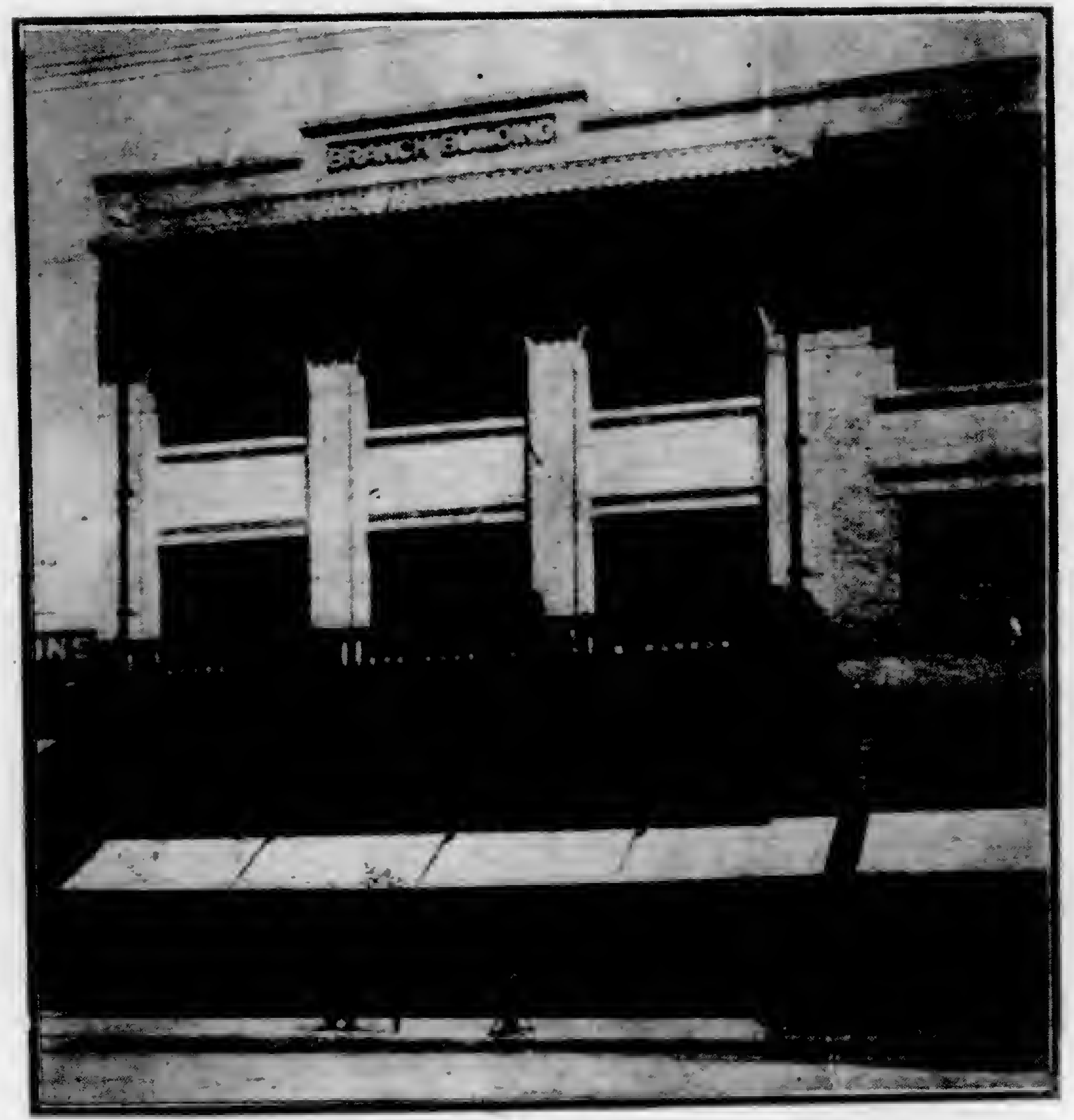
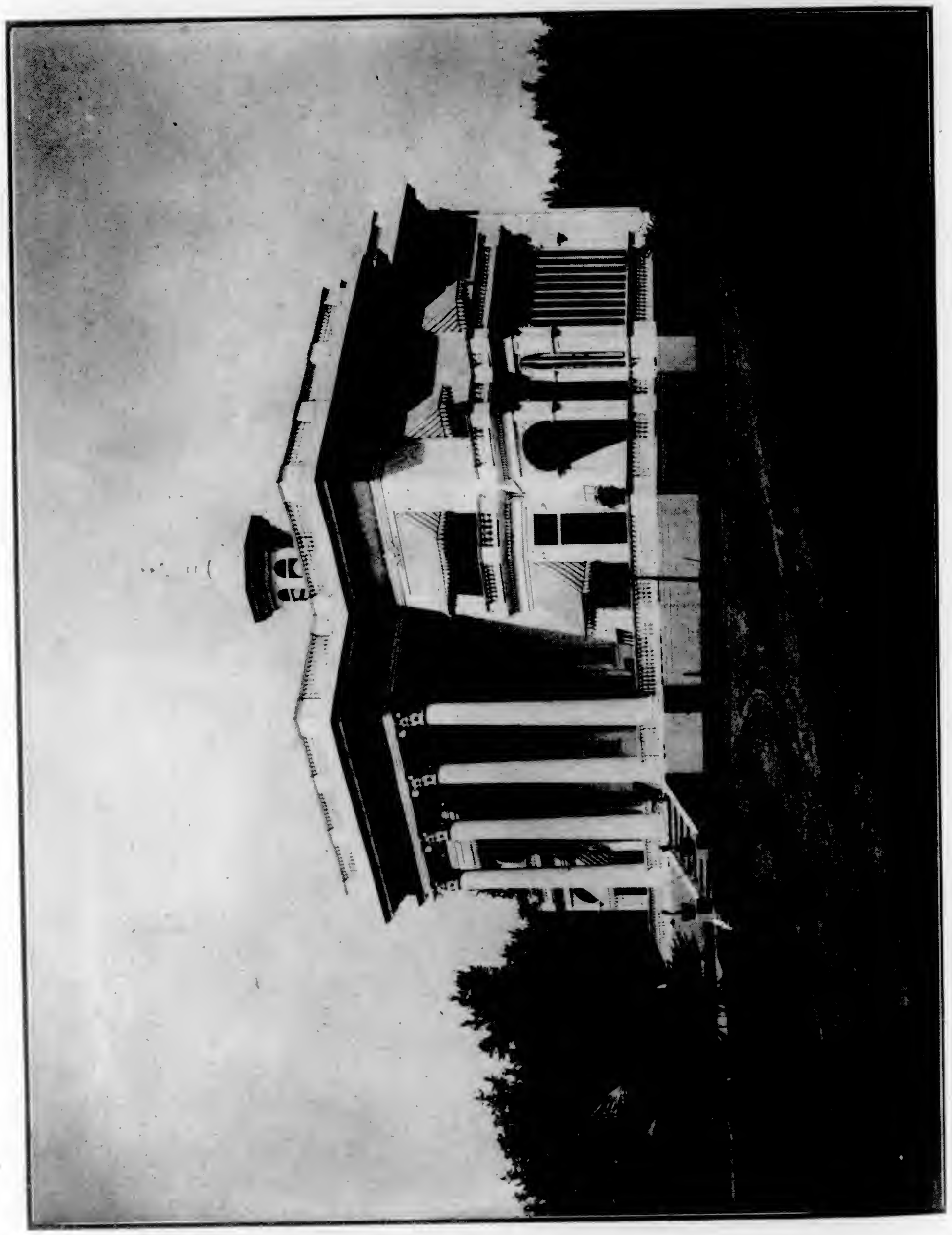
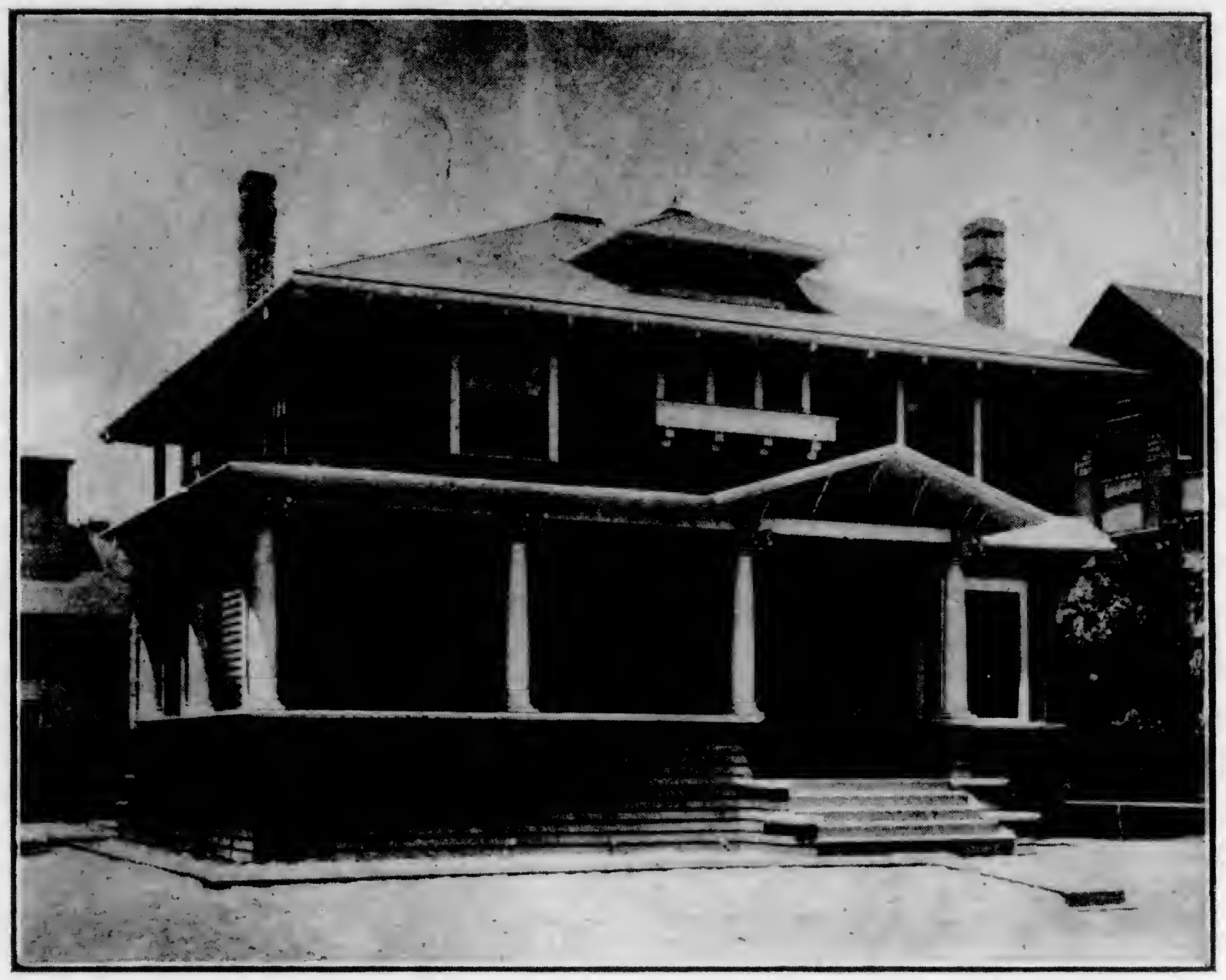


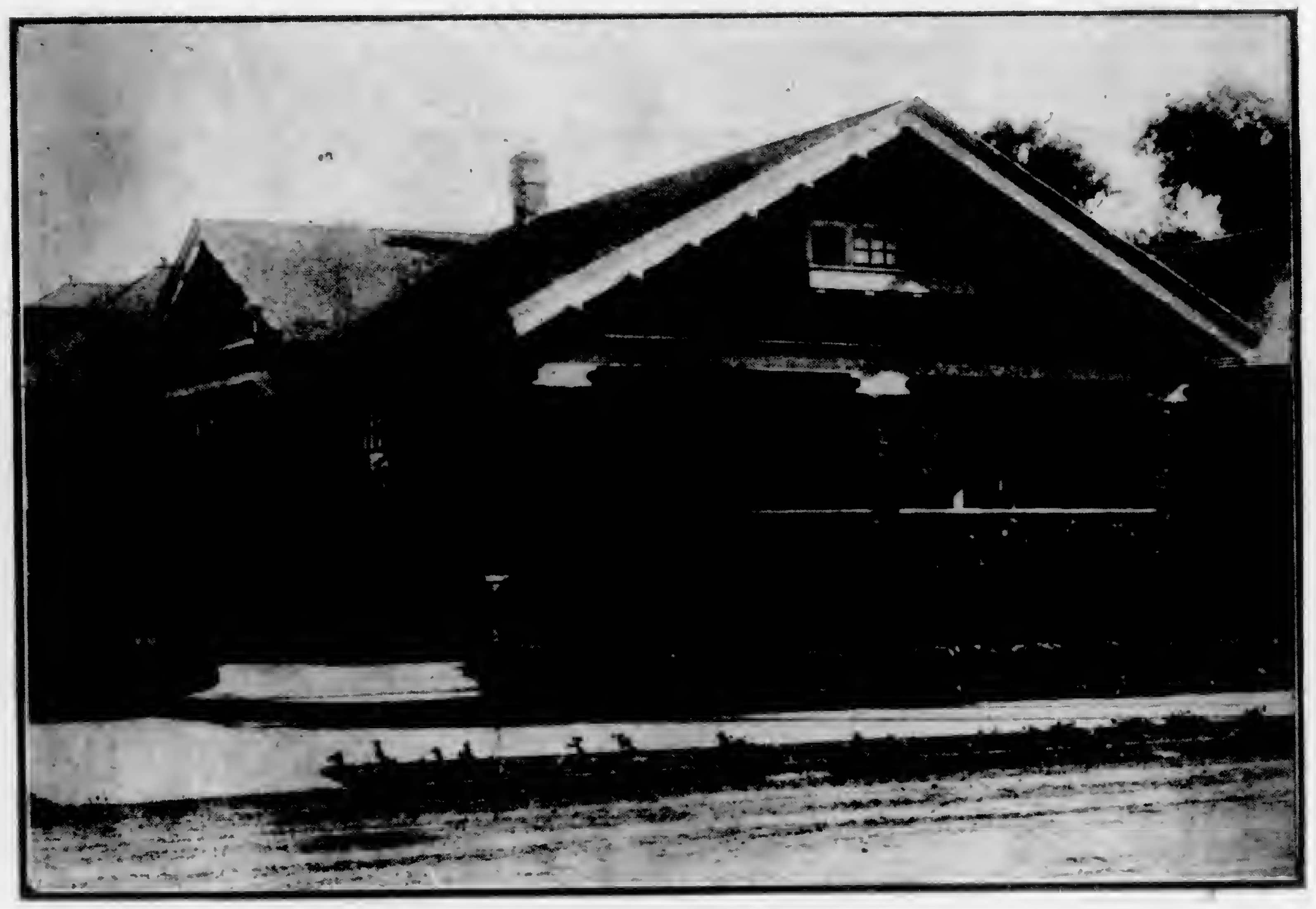
Branch Building, Stockton, Cal.
Walter King, Architect



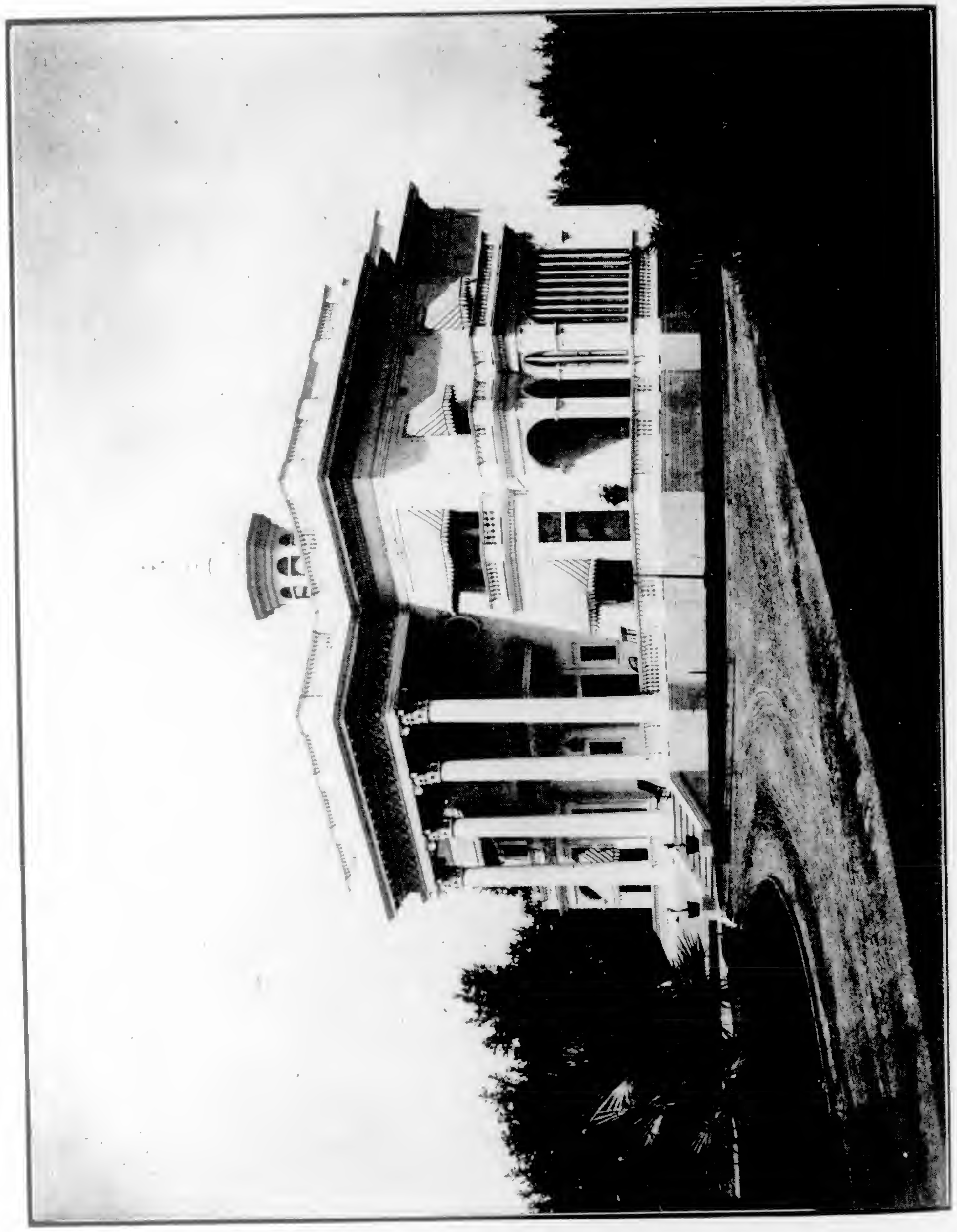
Superintendent's Residence, Stockton State Asylum
Walter King, Architect



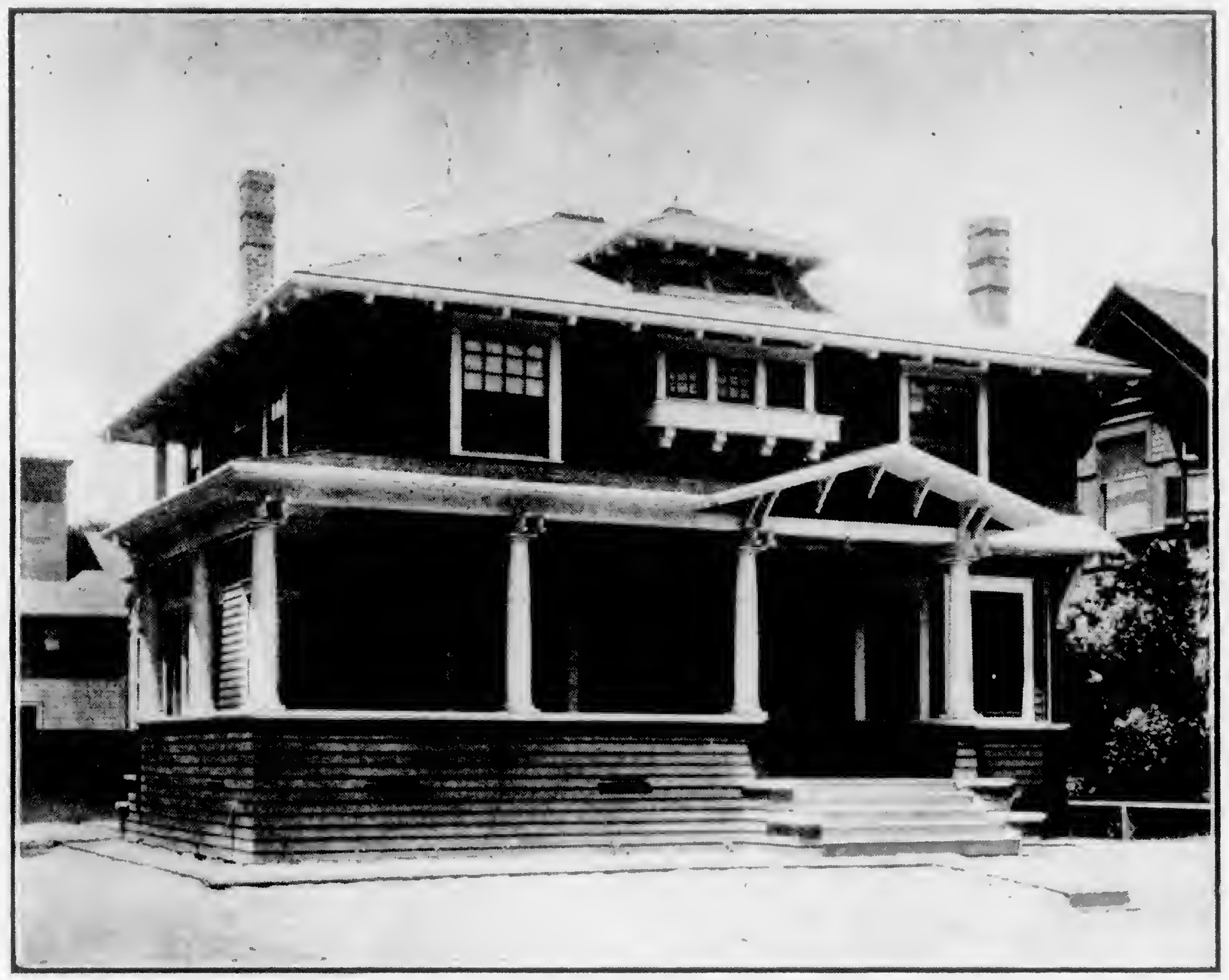
Residence of Mr. R. C. Bach, Stockton, Cal.
Walter King, Architect



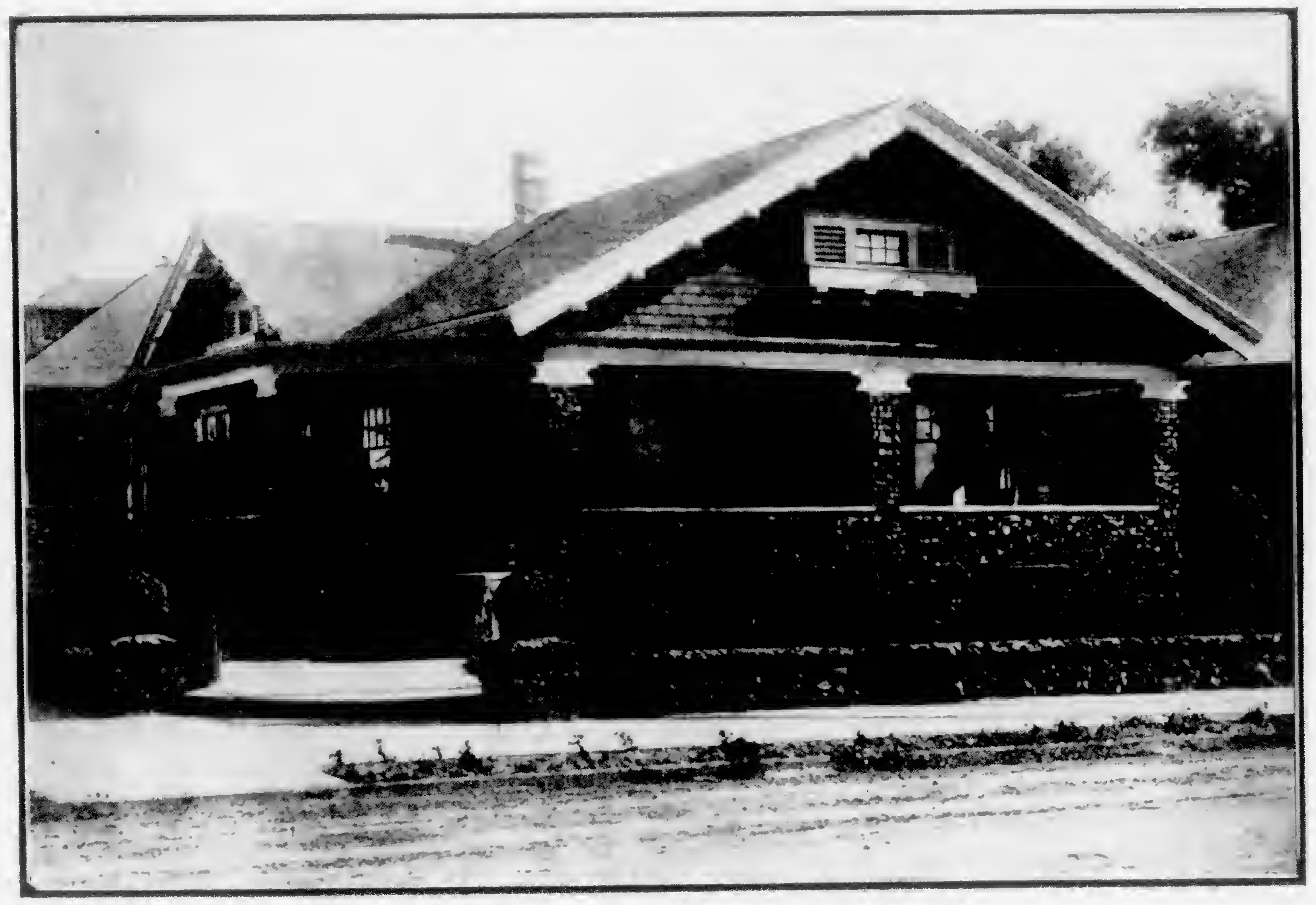
House of Mr. J. E. Crump, Stockton, Cal.
Walter King, Architect



Residence of Mr. [illegible], Stockton, Cal.
Walter King, Architect



Residence of Mr. R. C. Bach, Stockton, Cal.
Walter King, Architect



House of Mr. J. E. Crump, Stockton, Cal.
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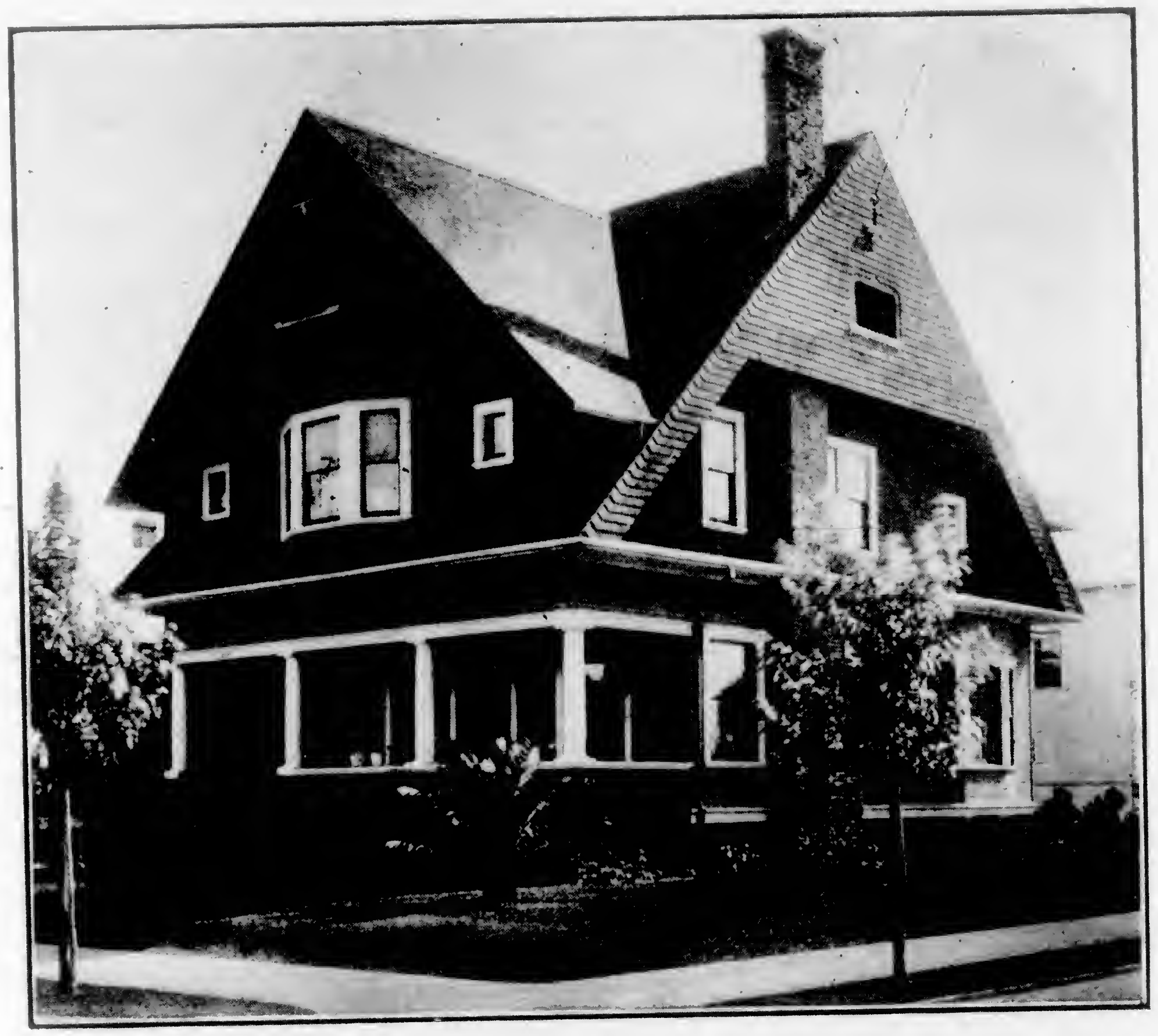
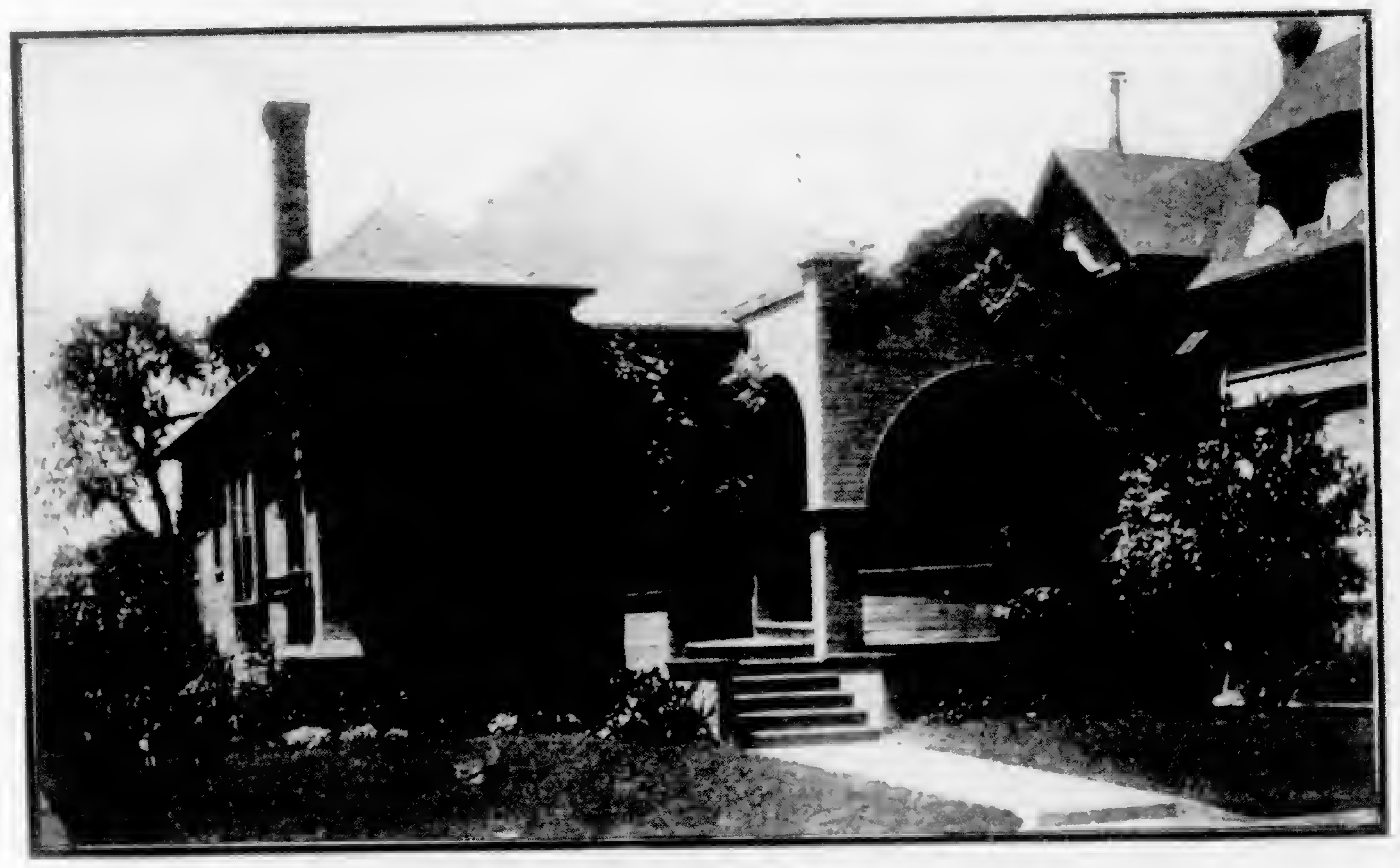
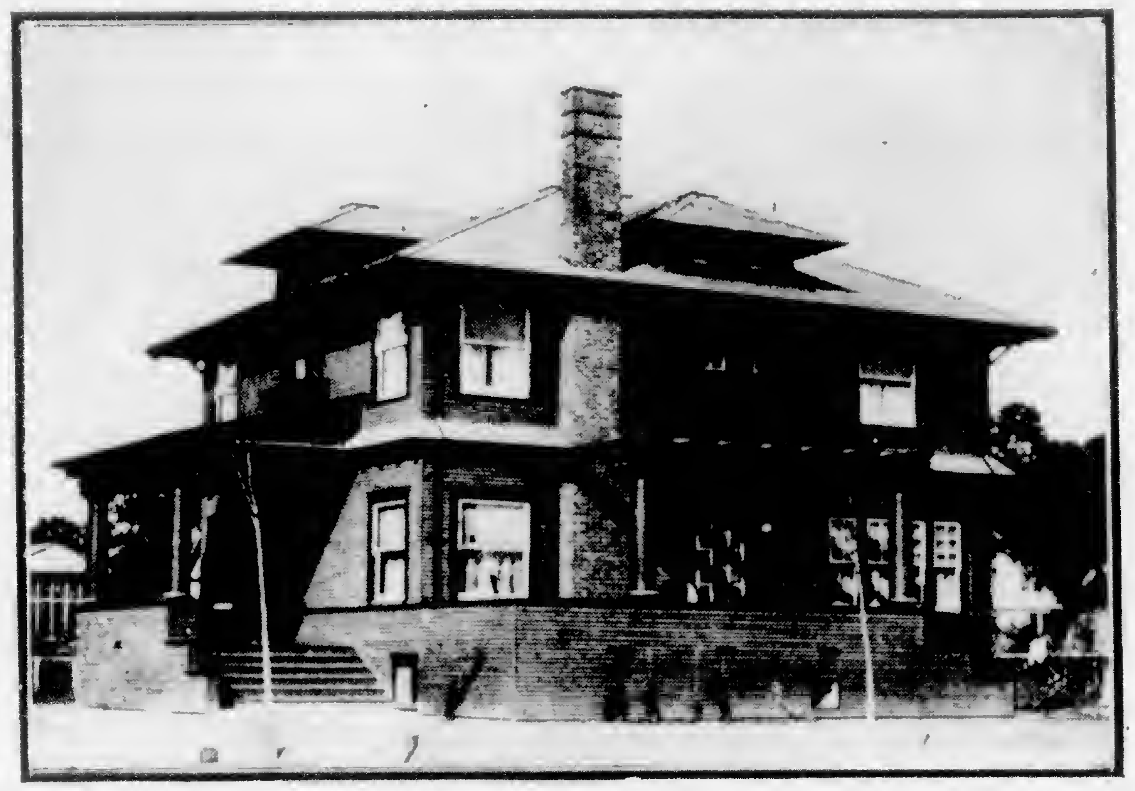


Residence of Mr. F. Yost, Stockton, Cal.
Walter King, Architect



House of Mr. W. J. Murray, Stockton, Cal.
Walter King, Architect



Residence of
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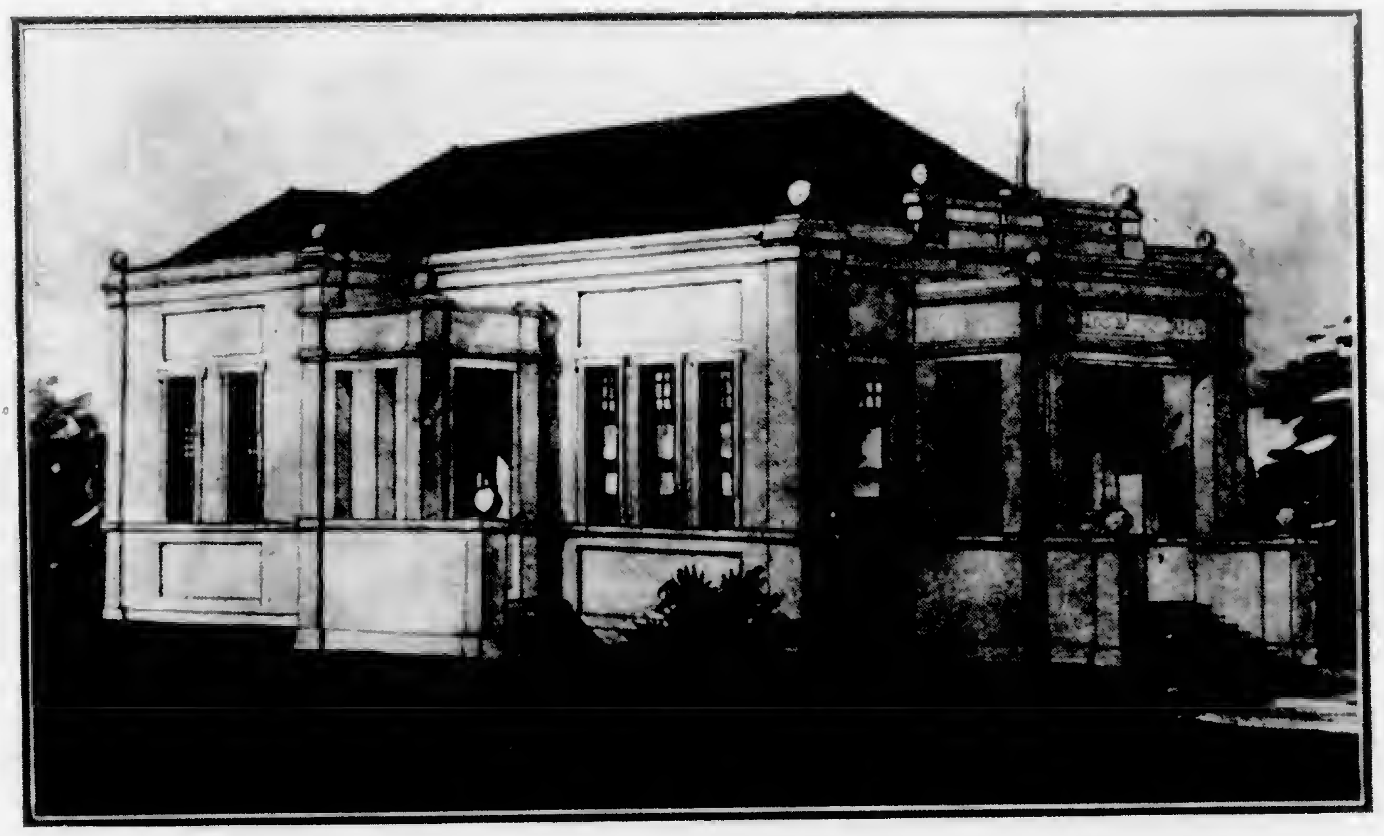
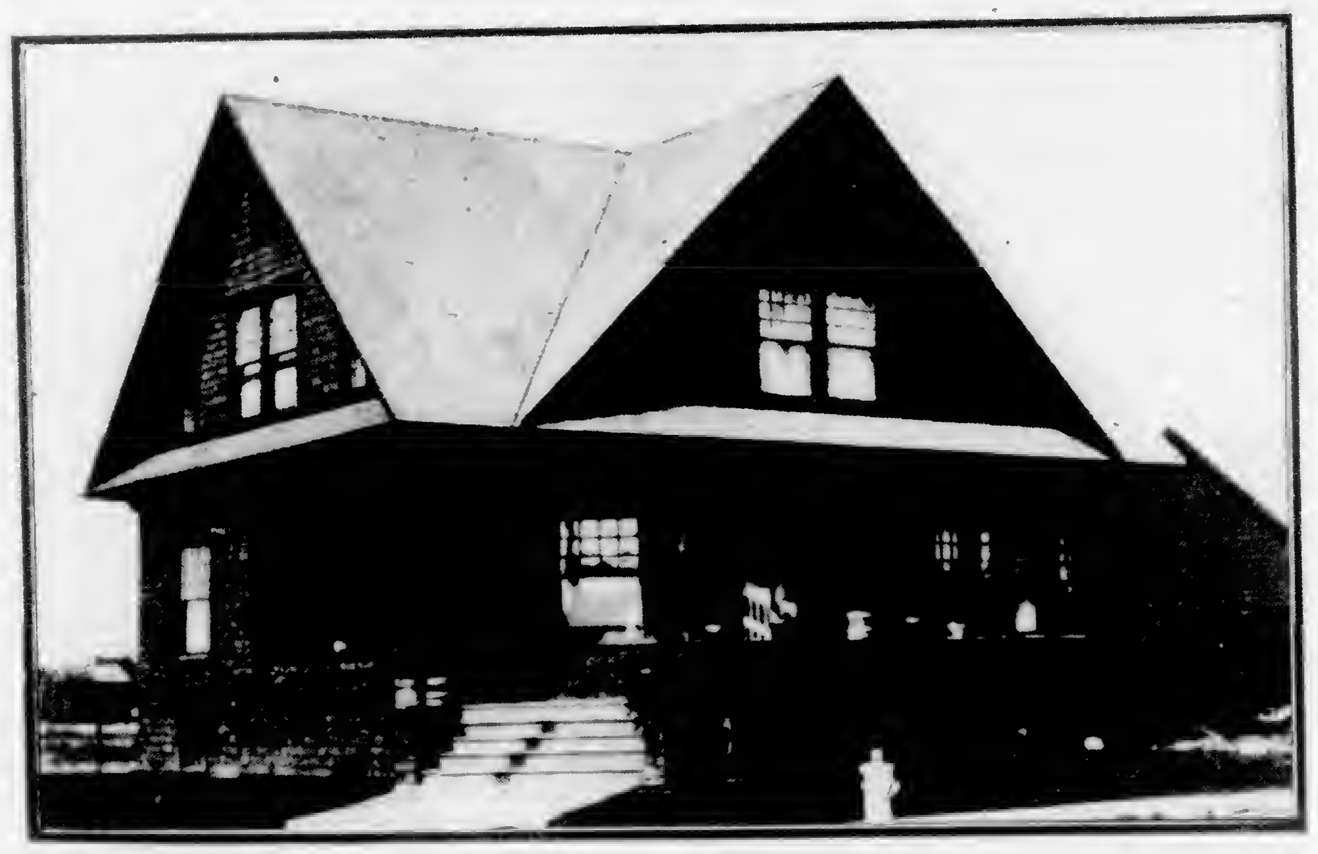
Walter King, Architect



Court and Jail
Building,
Los Banos, Cal.



Residence of
Mr. W. H. Snell
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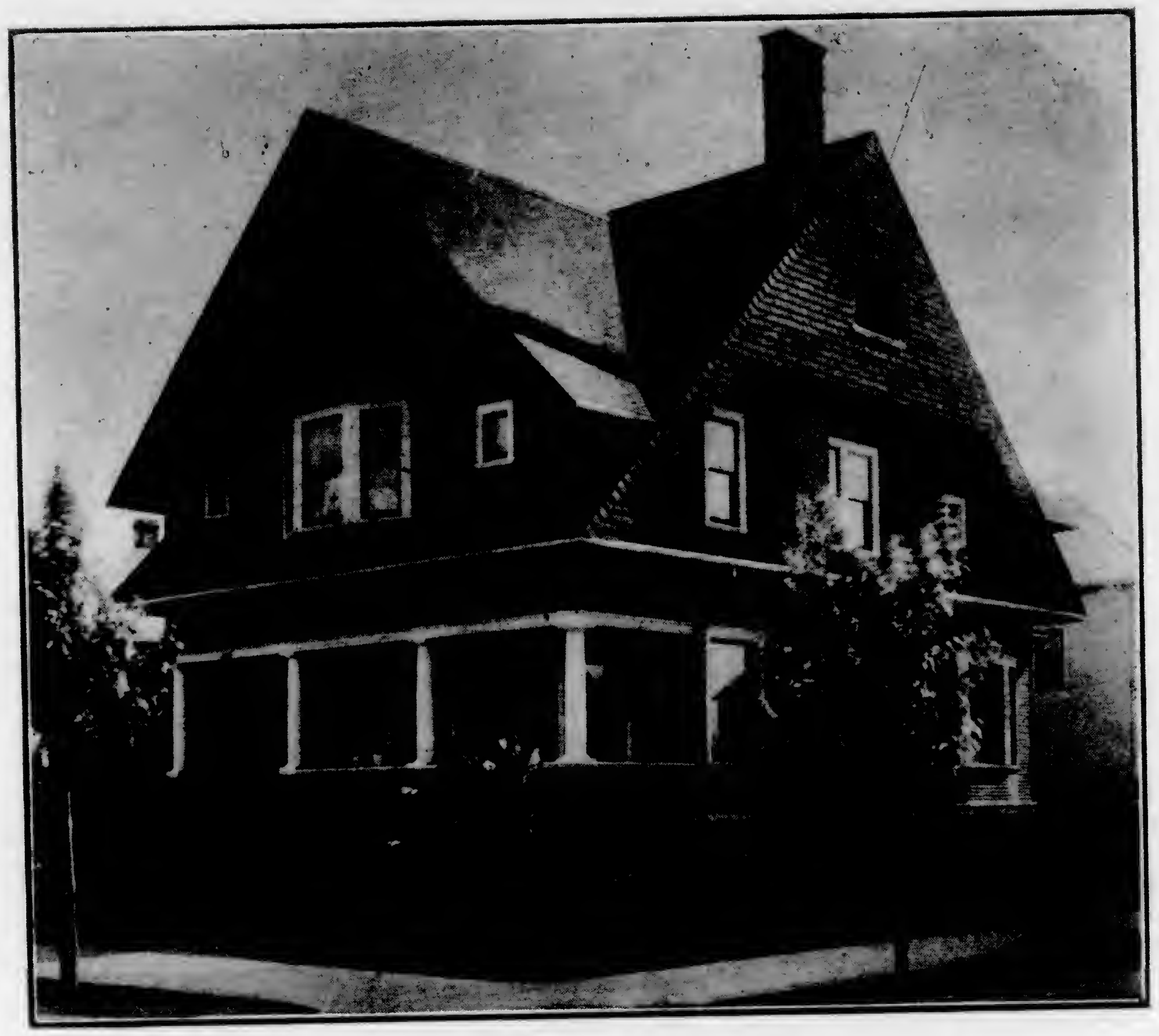

Residence of Mr. F. Yost, Stockton, Cal.
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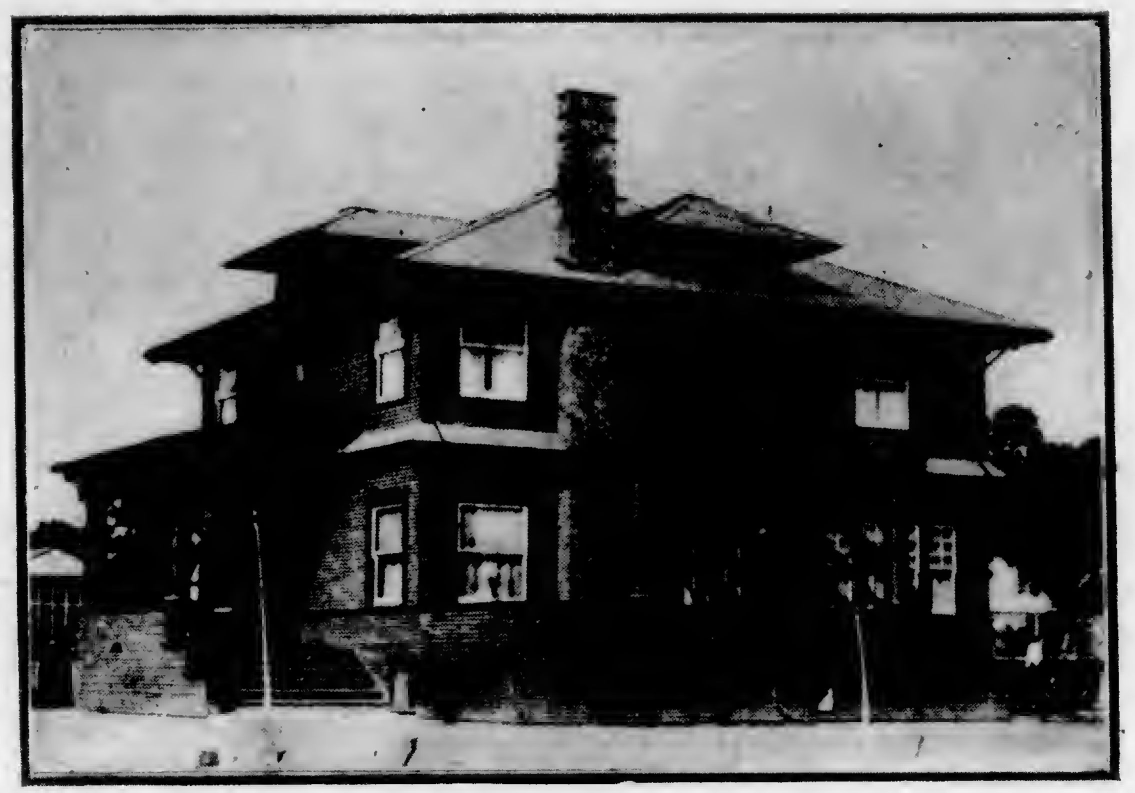

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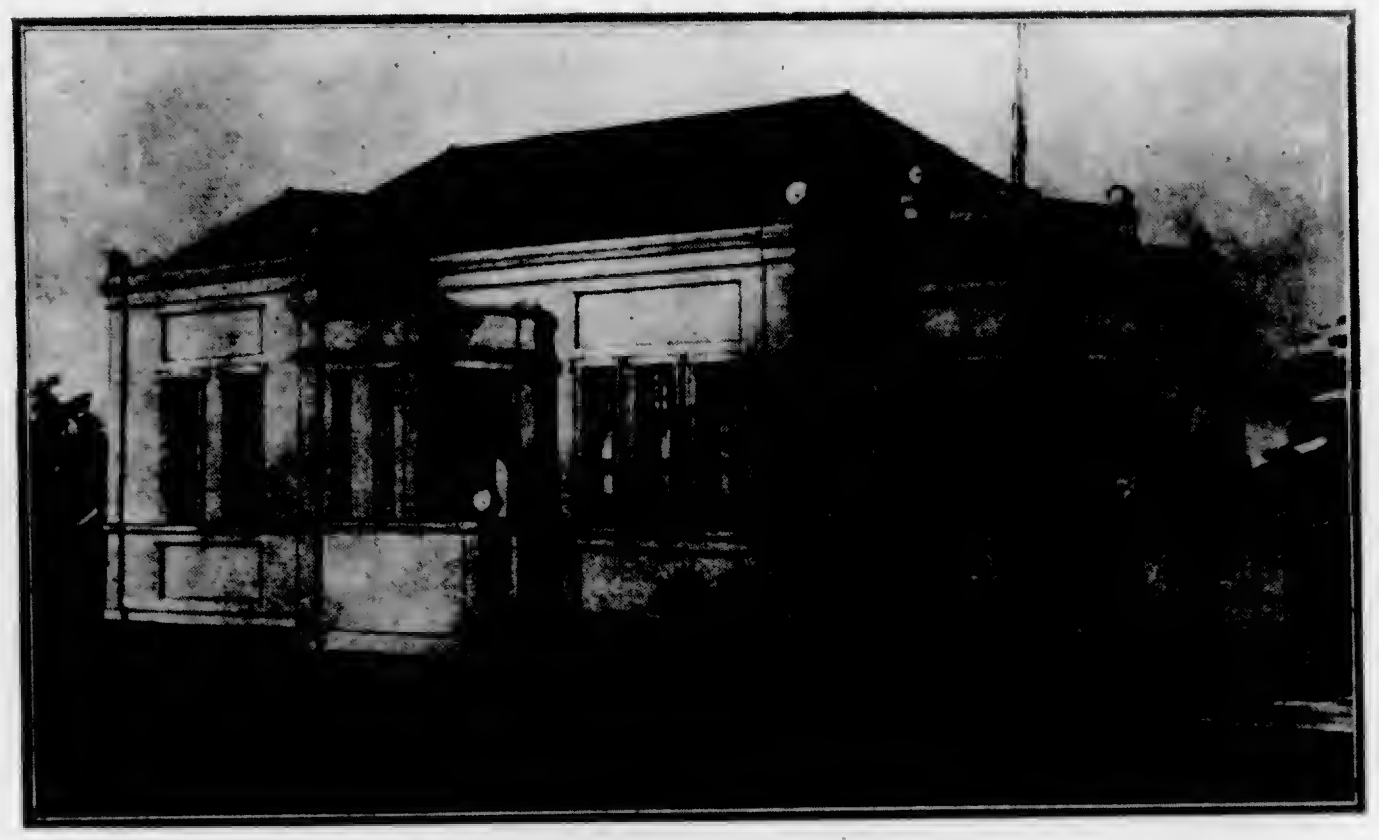

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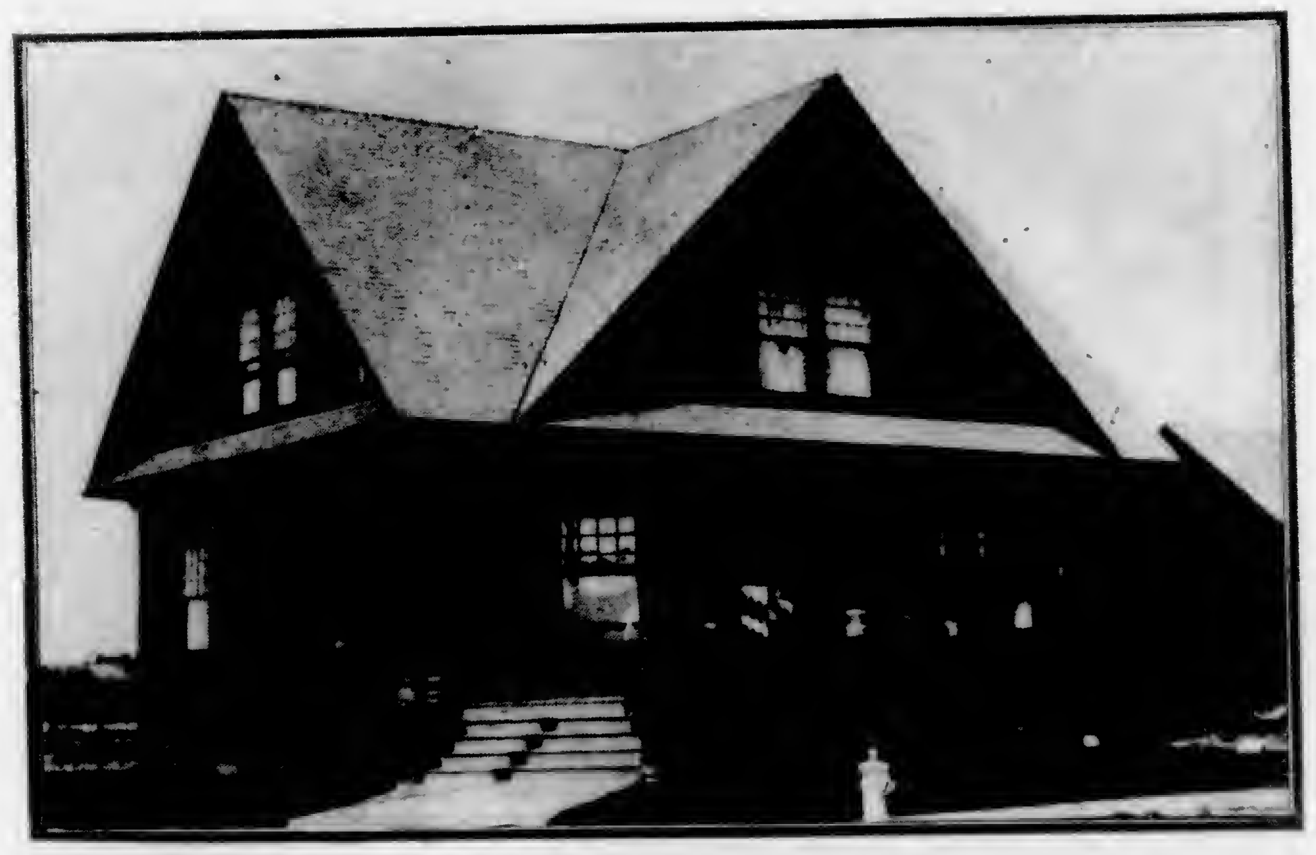

Residence of
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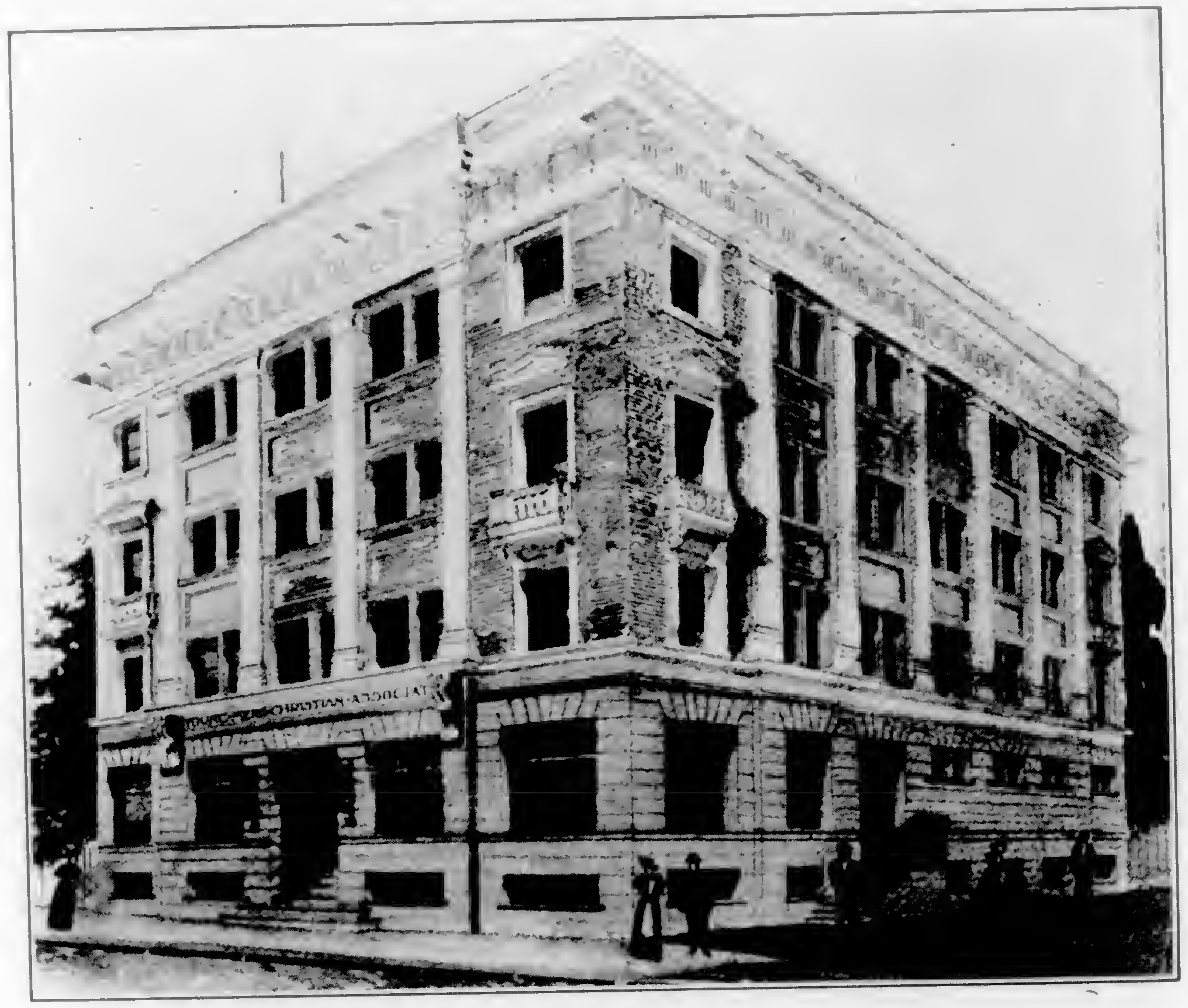
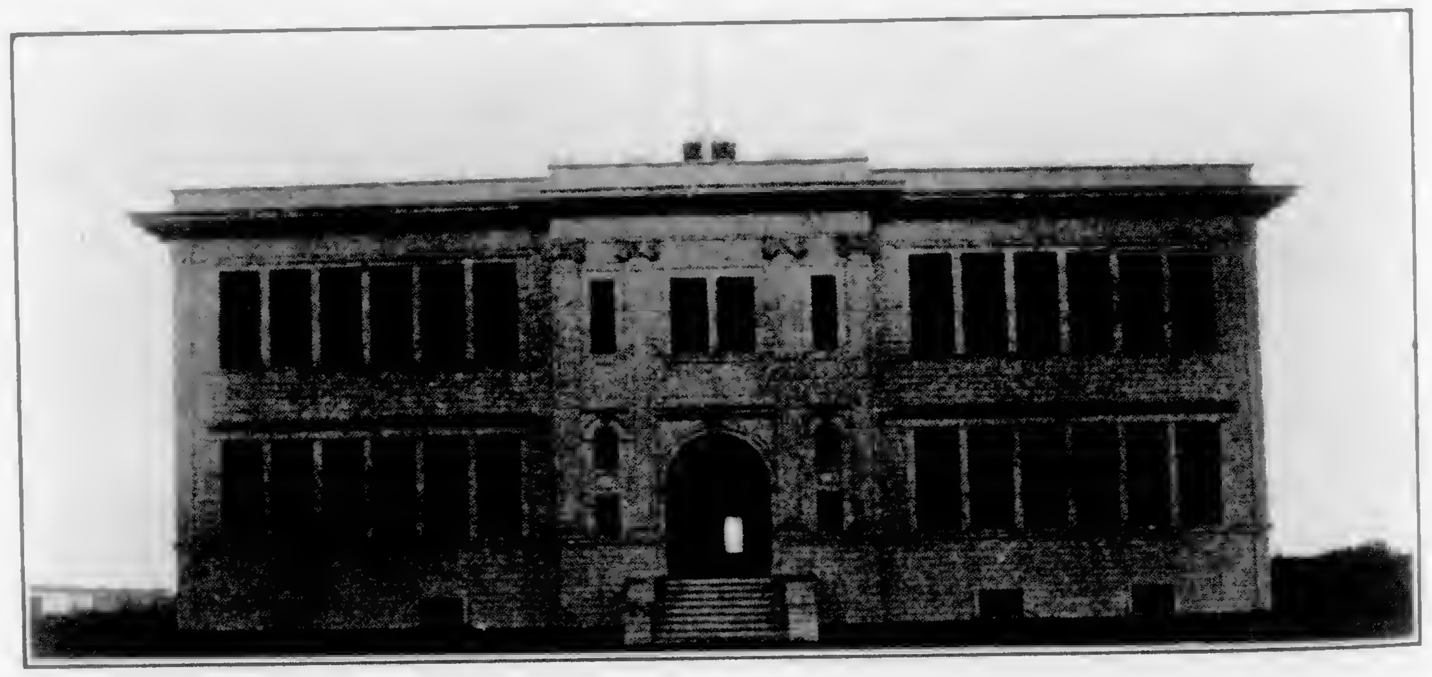
Glimpse of Stockton from the Estuary

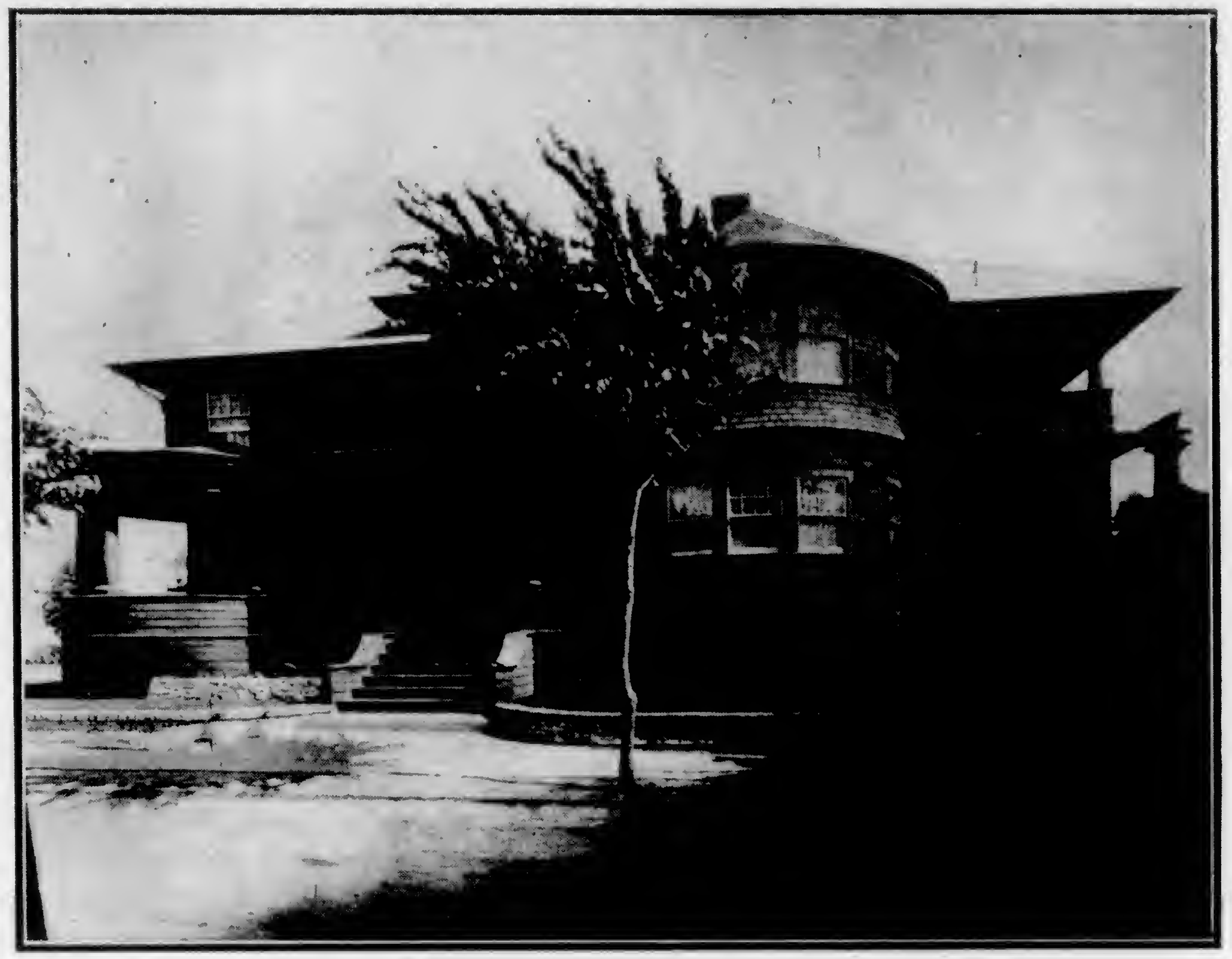


Sketch for New Y. M. C. A. Building, Stockton, Cal.
Walter King, Architect

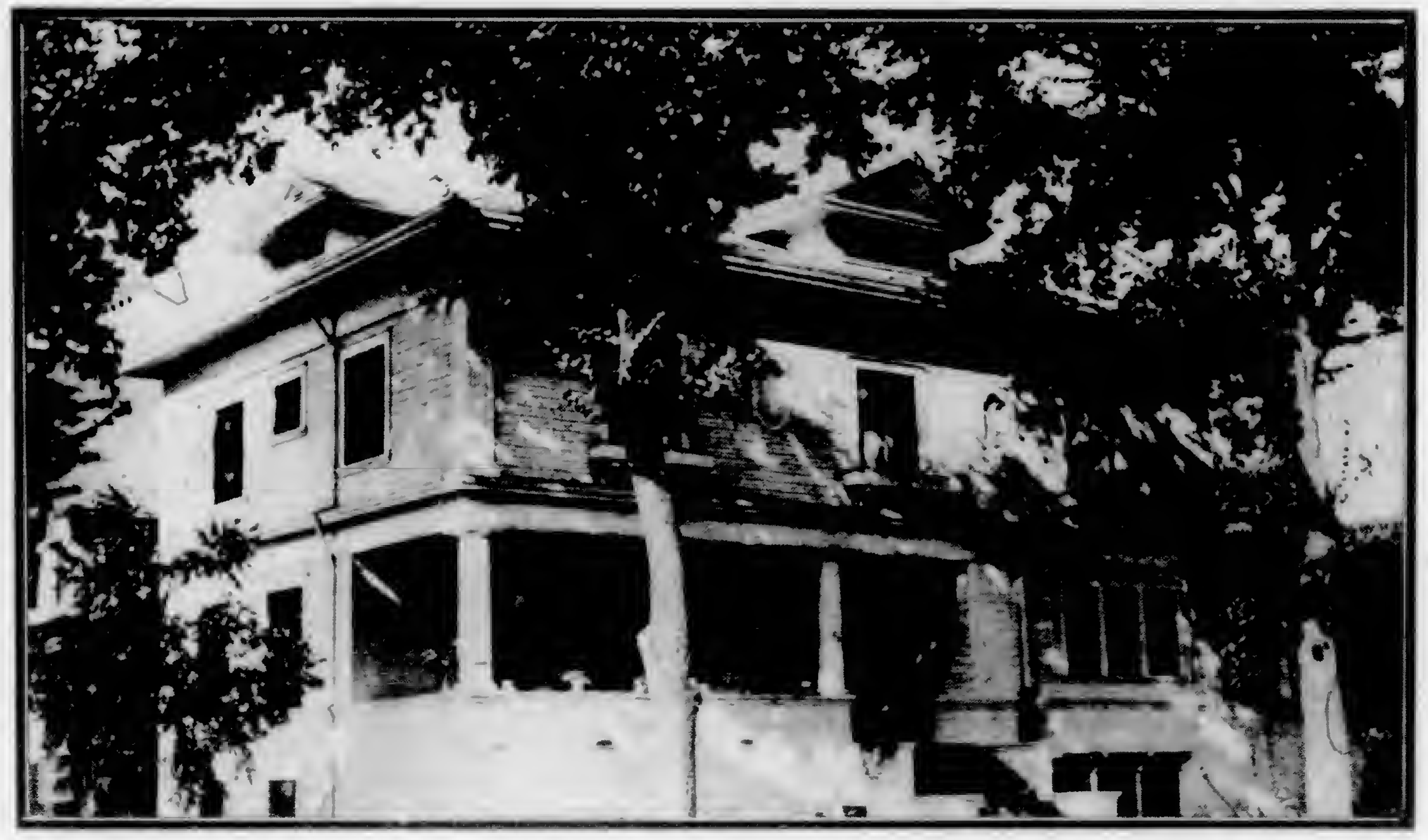


Grammar School at Lodi, Cal.

Walter King, Architect

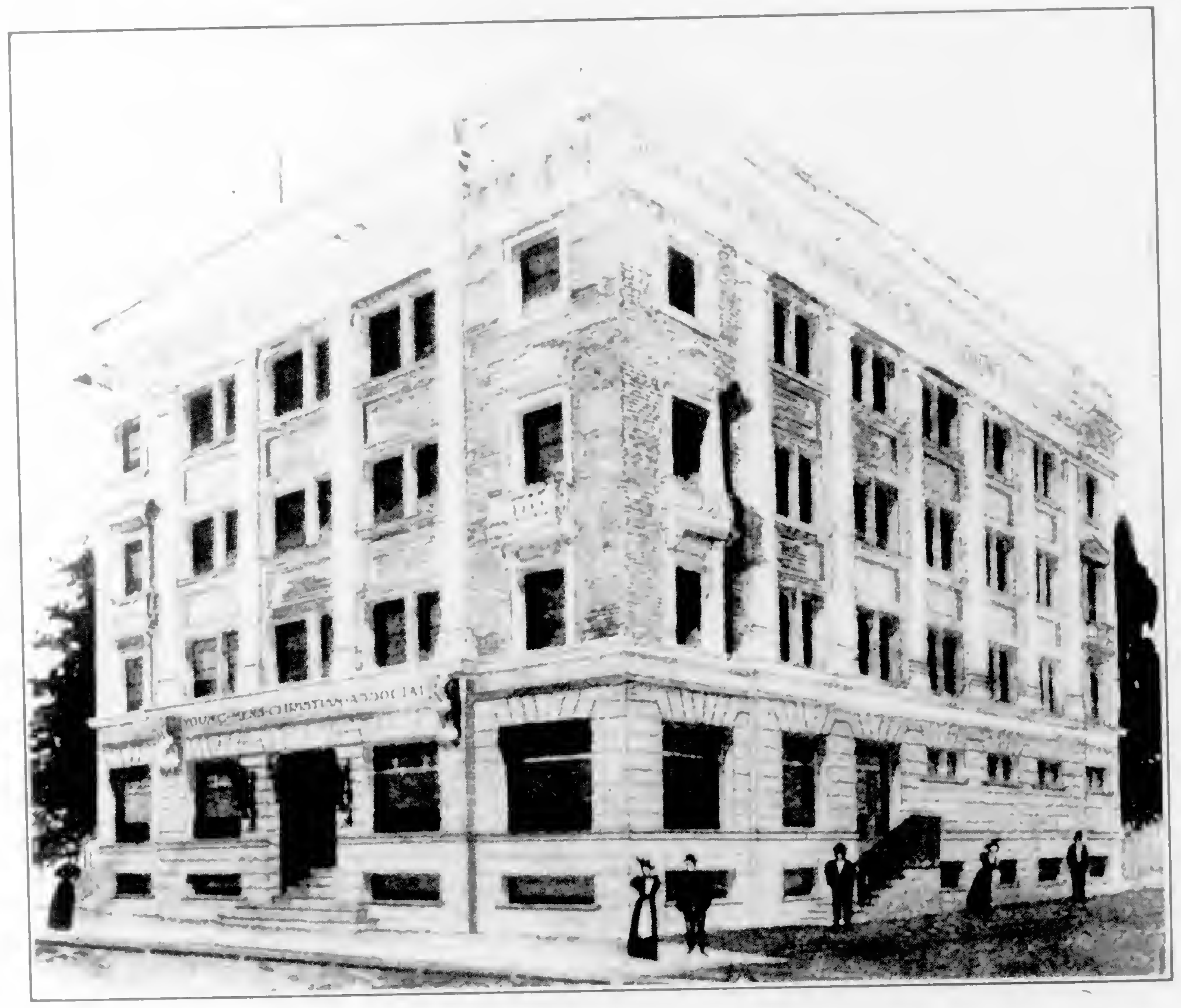


Residence of Mr. W. F. Sibley, Stockton, Cal.
Walter King, Architect *Chas. A. Hickson, Contractor*



Residence of Mr. T. W. Berthean, Stockton, Cal.
Walter King, Architect

Glimpse of Stockton from the Estuary



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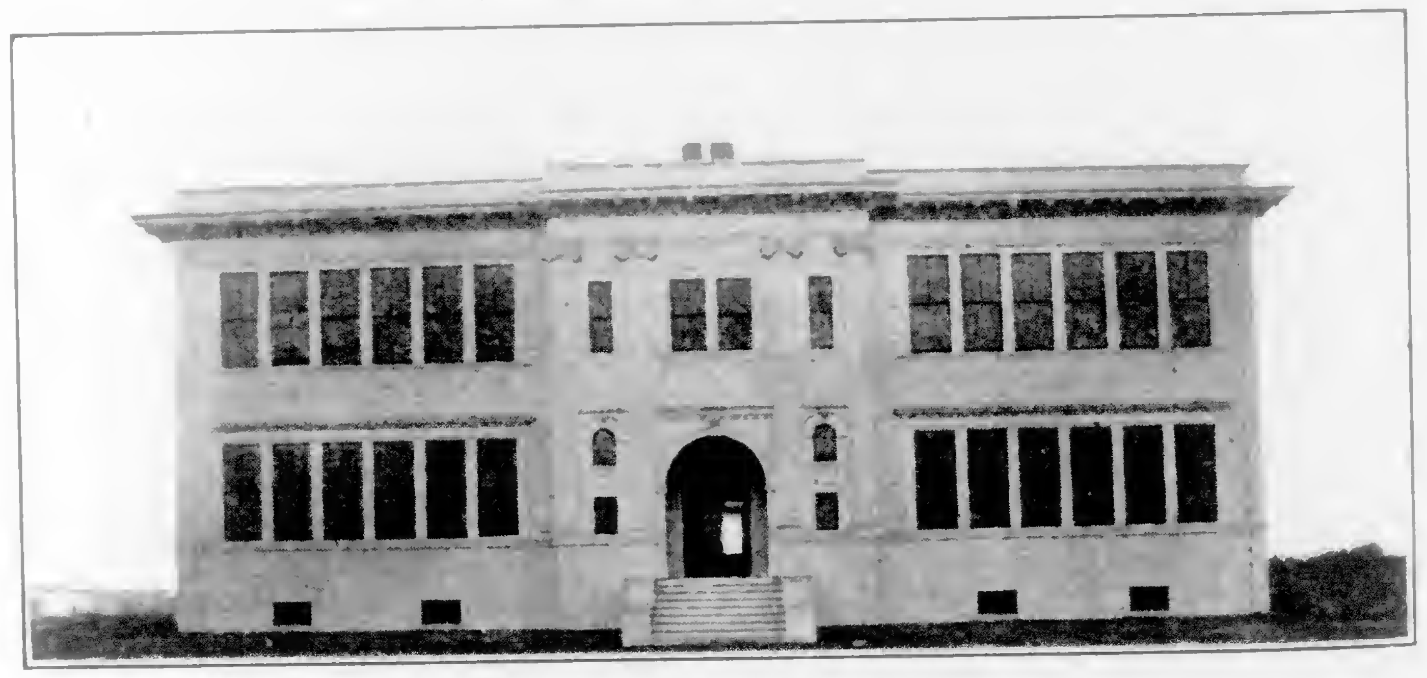

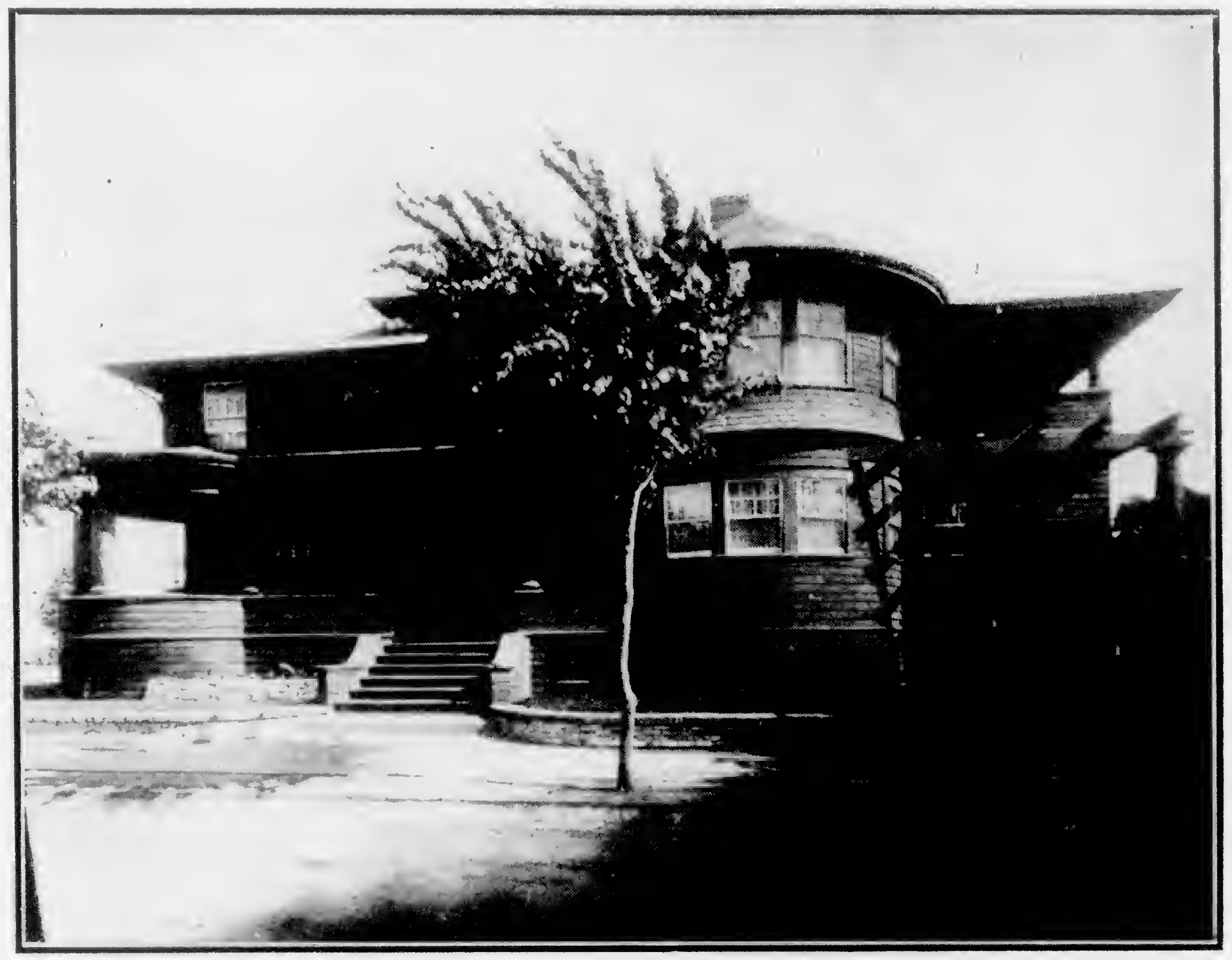

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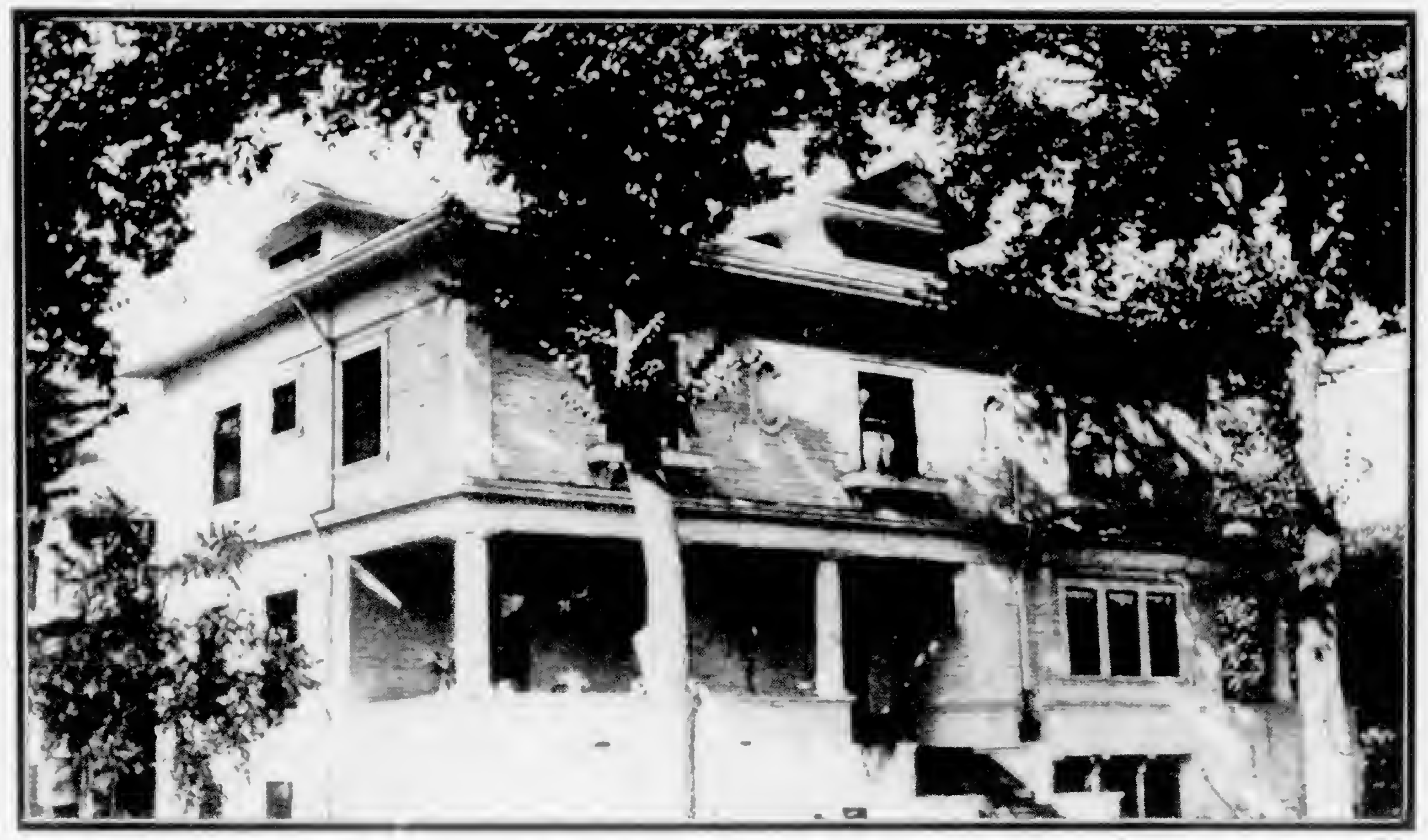

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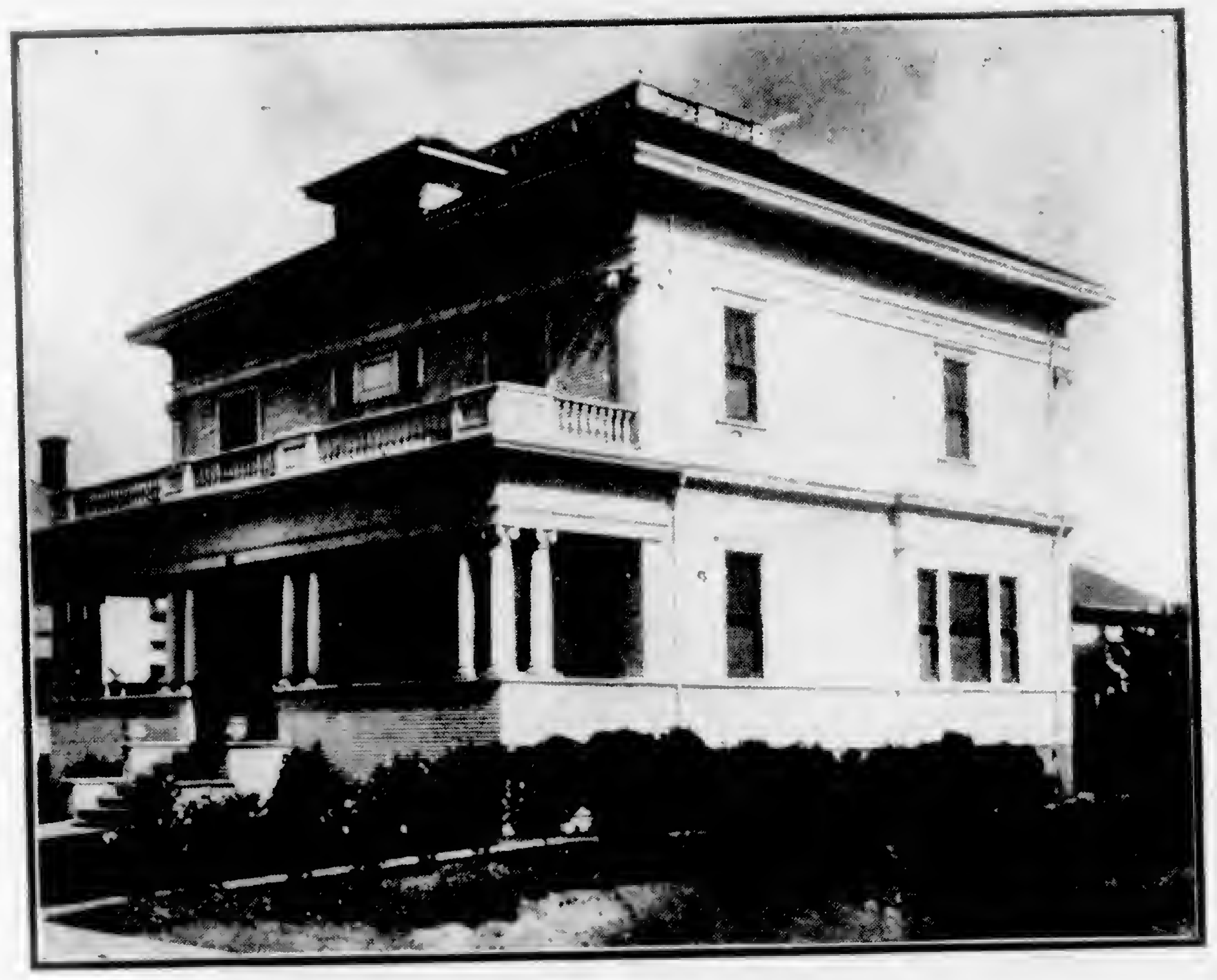
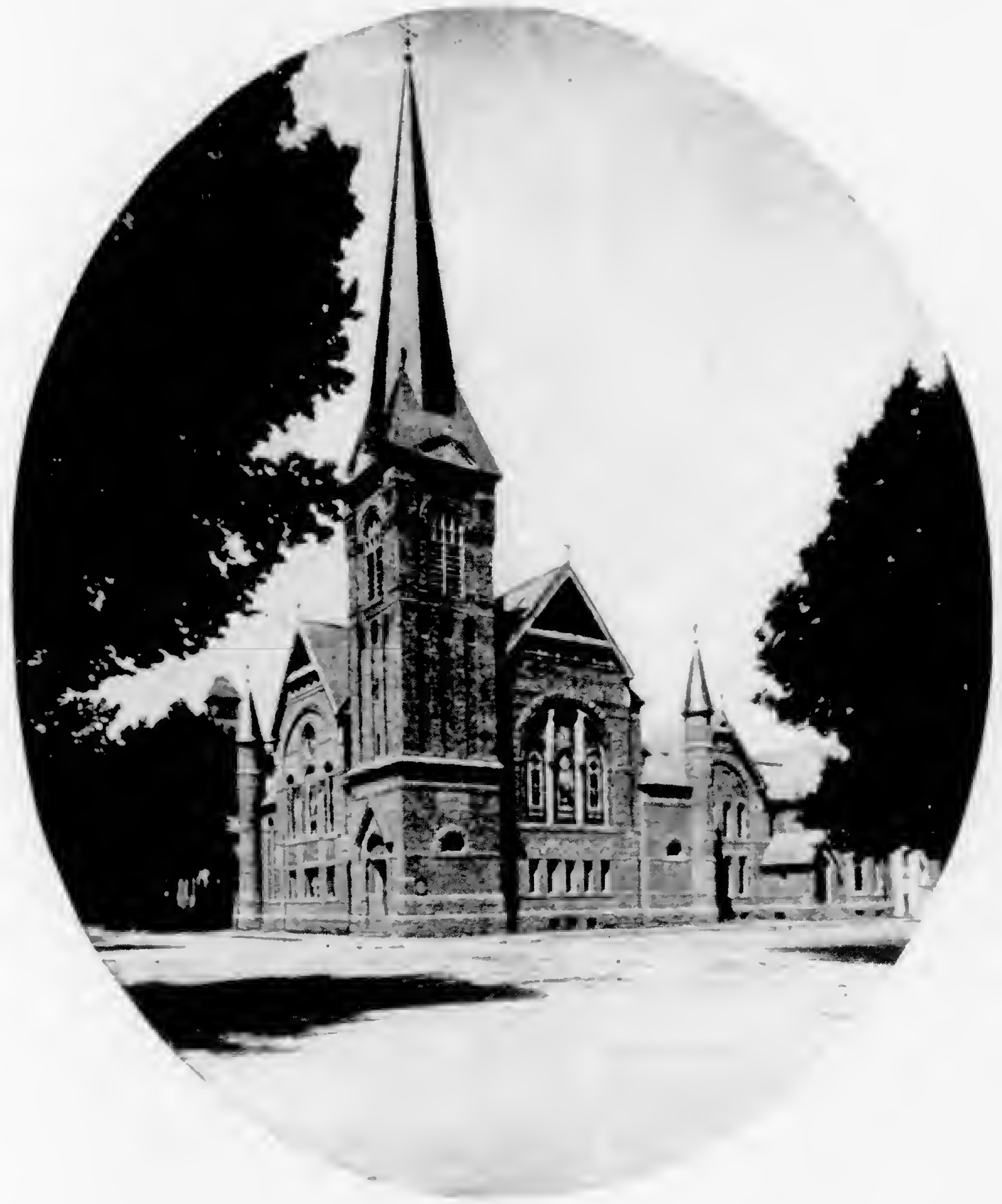
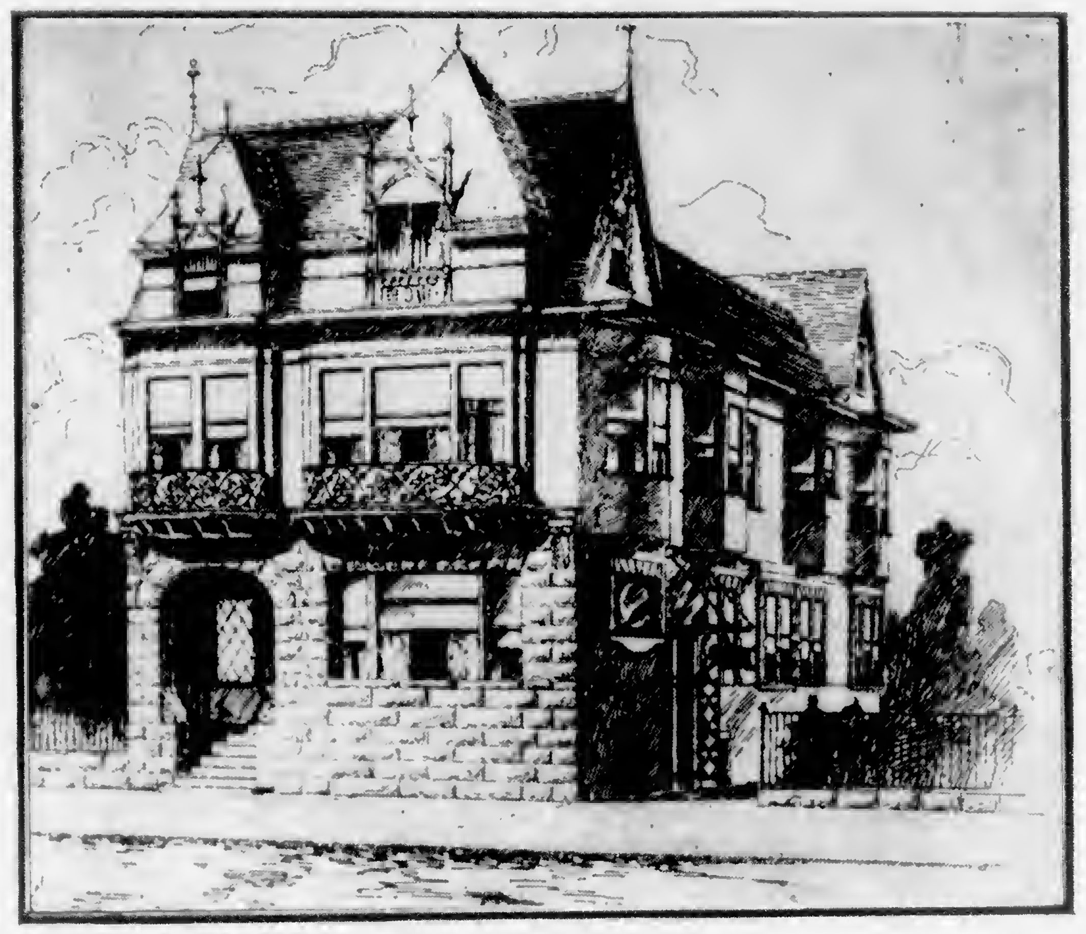


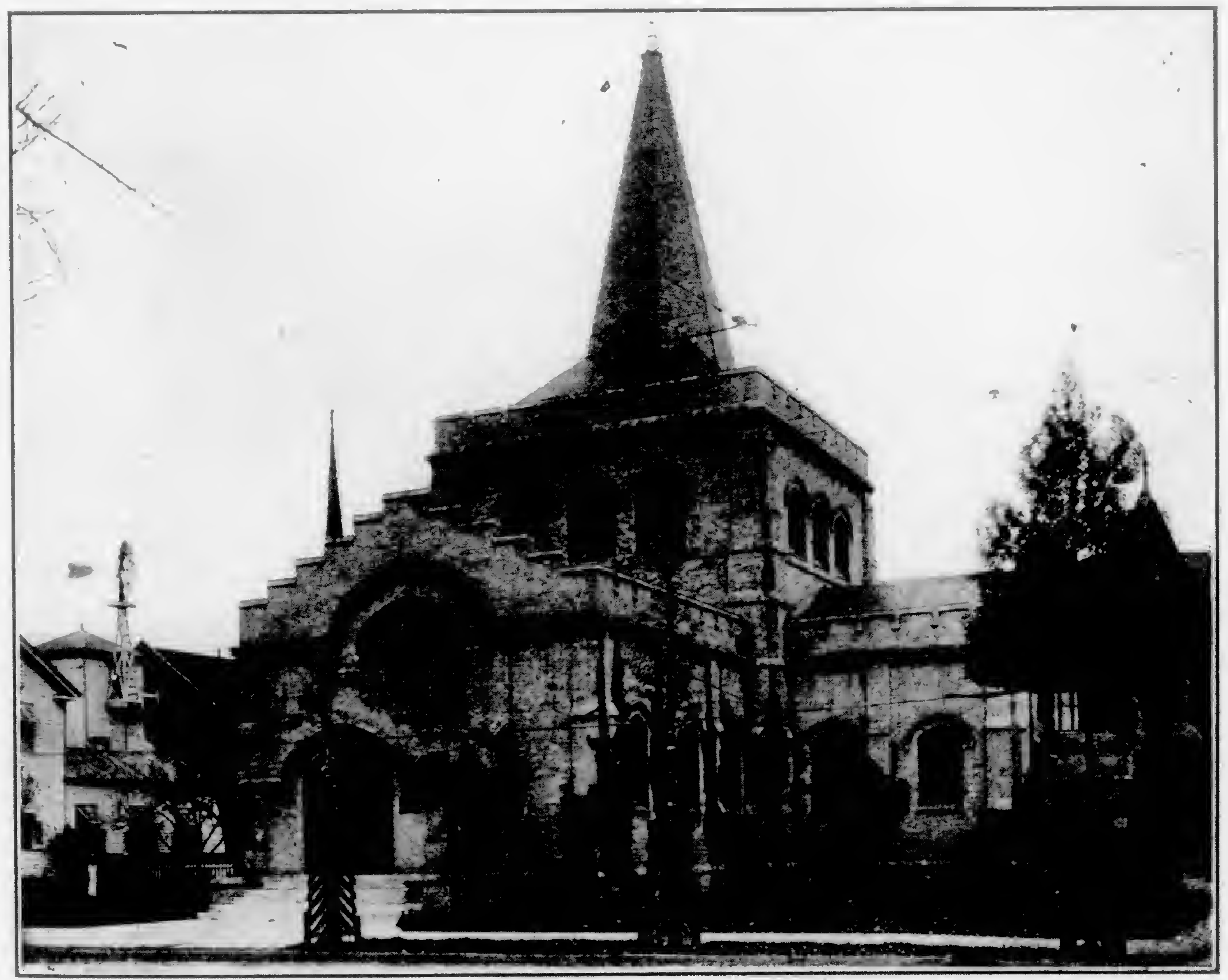
Residence of Francis Cutting, Stockton, Cal.
Walter King, Architect



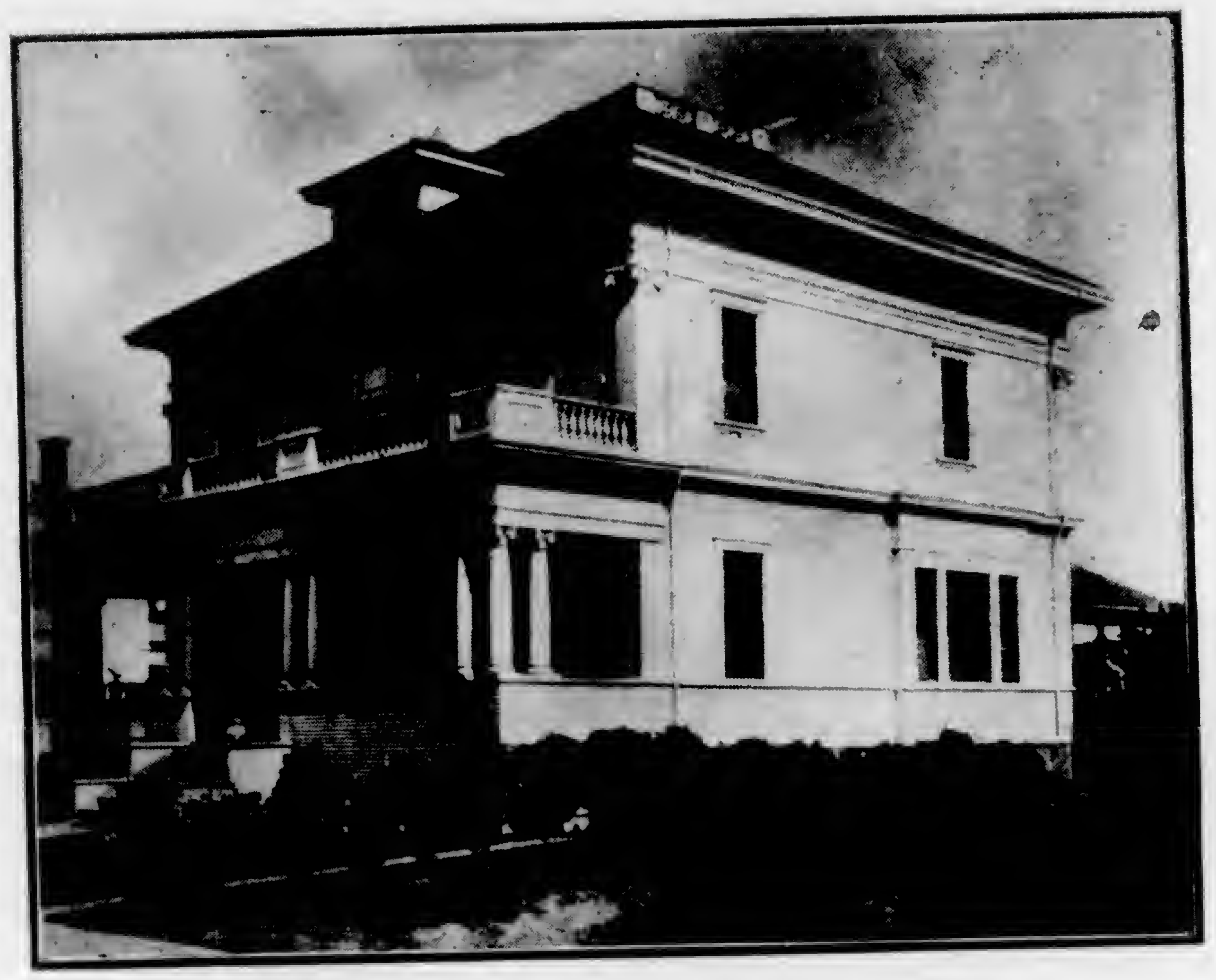
First Methodist Church, Stockton, Cal.



Residence for Dr. S. J. Hunkin, San Francisco Cal.



Episcopal Church, Stockton, Cal.



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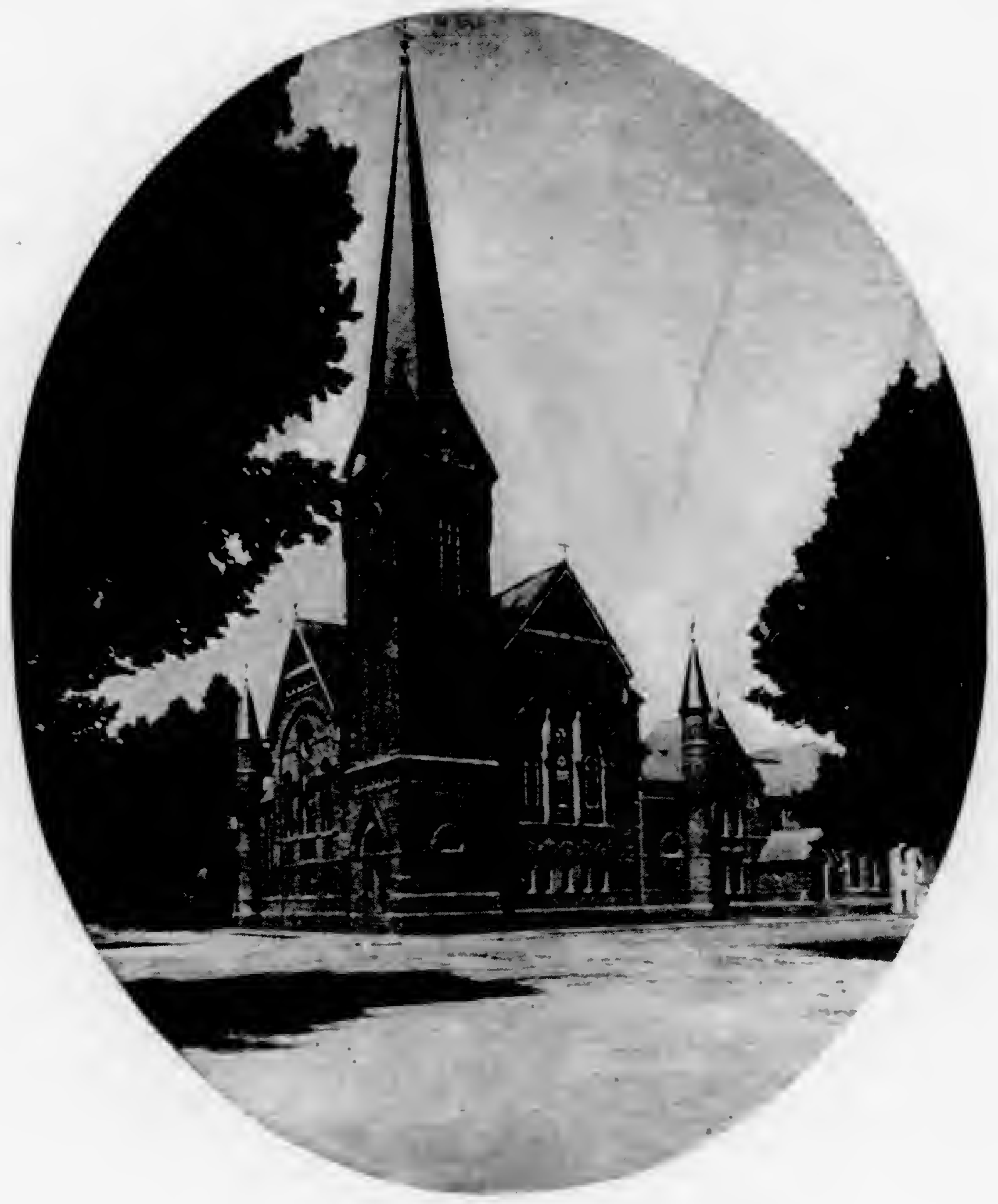
Walter King, Architect



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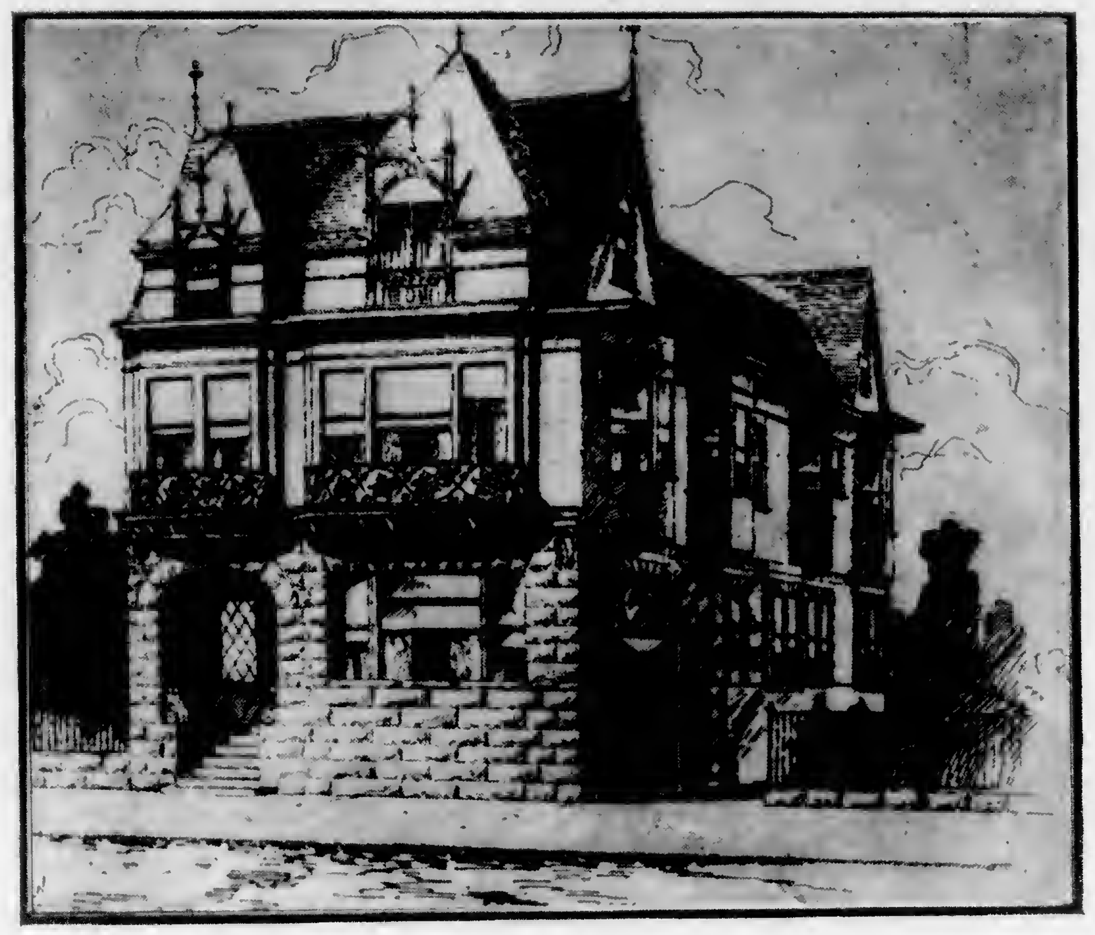


Residence for Dr. S. J. Hunkin, San Francisco Cal.

Episcopal Church, Stockton, Cal.

The Catalogue Nuisance

By V. O. WALLINGFORD, Architect, San Bernardino, Cal.

THE small architect who prepares his own drawings and specifications, the specification writer in the big office, or the structural and consulting engineer, is at once and again confronted with the abiding question of the catalogue.

Catalogues are persistent things, awkward things, and marvelously inconvenient. They come in all sizes, all shapes, all manner of bindings and finish. There are the bulky cloth-bound, gilt-lettered plumbing goods catalogue; the weekly circulars of the artificial ventilating or machine conveying manufacturers; and the pocket manual of instruments of precision. The catalogue that lists the articles manufactured or handled by some concern, with description and prices, merges gradually through various phases of advertising ingenuity, into a carefully edited "Boiler Magazine," a "Valve World" or a "Spectrum."

They range in size from a cloth and gold quarto volume of fine engravings to a dainty vest-pocket booklet. And there is as much variety in contents as appearance. Some of them describe minutely all the essential as well as the "talking points," with details of construction; while others merely suggest an article and its use.

What to do with each of these publications, how to classify them, how much time to give them, which to keep and which to throw away, how long to keep any of them: All these questions are sources of more or less anxiety and annoyance.

About four years ago, a boiler and heating apparatus manufacturer sent me a small leather-bound book containing a list of his boilers, types of radiation, telegraph code and convenient formulae for determining heating results. The book was of such size as to be convenient for handling, or even to carry in the pocket if desirable, and contained all the material necessary, and such specialized information as to make it of genuine value in the preparation of heating and ventilating specifications, together with several blank pages for notes. This I consider the ideal catalogue for presenting its contents to the architect or engineer, and of proper size for convenience in handling, filing or consultation.

The architect in preparing his specifications has no need for literature on the articles he specifies, or needing it he probably lacks time to read a manufacturer's catalogue to obtain it. We may consult the catalogue for special information, and of all those in my file, that of the heating goods mentioned above is the most satisfactory.

The plumbing goods manufacturer or the finish hardware jobber finds it necessary to publish a very expensive volume of engravings in such style as to demand a special shelf for its reception, where it gathers dust and eventually becomes a scrap book for the office boy.

In preparing the plumbing specifications, it is a common practice to use the large catalogue and refer to the various fixtures by catalogue number, selecting each by means of the description and illustration. Generally there are prices appended and these are high enough to cover the installation, so that the sum of the catalogue prices will approximate the cost of the job, less the drainage. I do not know of any means of doing away with the plumbing goods catalogue as a comprehensive reference book.

In 1905 a large manufacturer of plumbing goods published a book of enamelled lavatories, bound in leather, well printed and illustrated, on high grade paper, and only four and one-half by seven and one-half inches in size. I thought this the perfection of its class of catalogue, and I urged the publishers to issue similar volumes covering all their lines and to abandon the old style bulky publication.

The finish hardware catalogue, another big clumsy aggregation of engravings, I do not consider a necessity to the architect. The dealer has his samples and styles, and should be able to supply all the information that the client may require without burdening the architect with the storage, and the inconvenience of keeping track of supplements and changes.

In addition to these examples, we have the annual catalogues published by the fireproofing concerns, which may contain formulae, data and concrete information regarding this type of work. These booklets are of more or less value for the technical material they may contain and are thus worth keeping.

Of the hundred and two miscellaneous catalogues annually received, a hundred of them are of no value at all, and the other two are of such widely different sizes as to make their filing quite impossible.

One or two catalogues of each standard line of goods to be specified, is quite essential to the survey and composition of specifications. These ought to be of some standard and uniform size.

A book whose dimensions are somewhere between five by eight to seven by twelve inches, ought to be large enough to fully illustrate any article desired; it would be small enough to lie on the table and still leave room to work; and would be light enough to handle without fatigue.

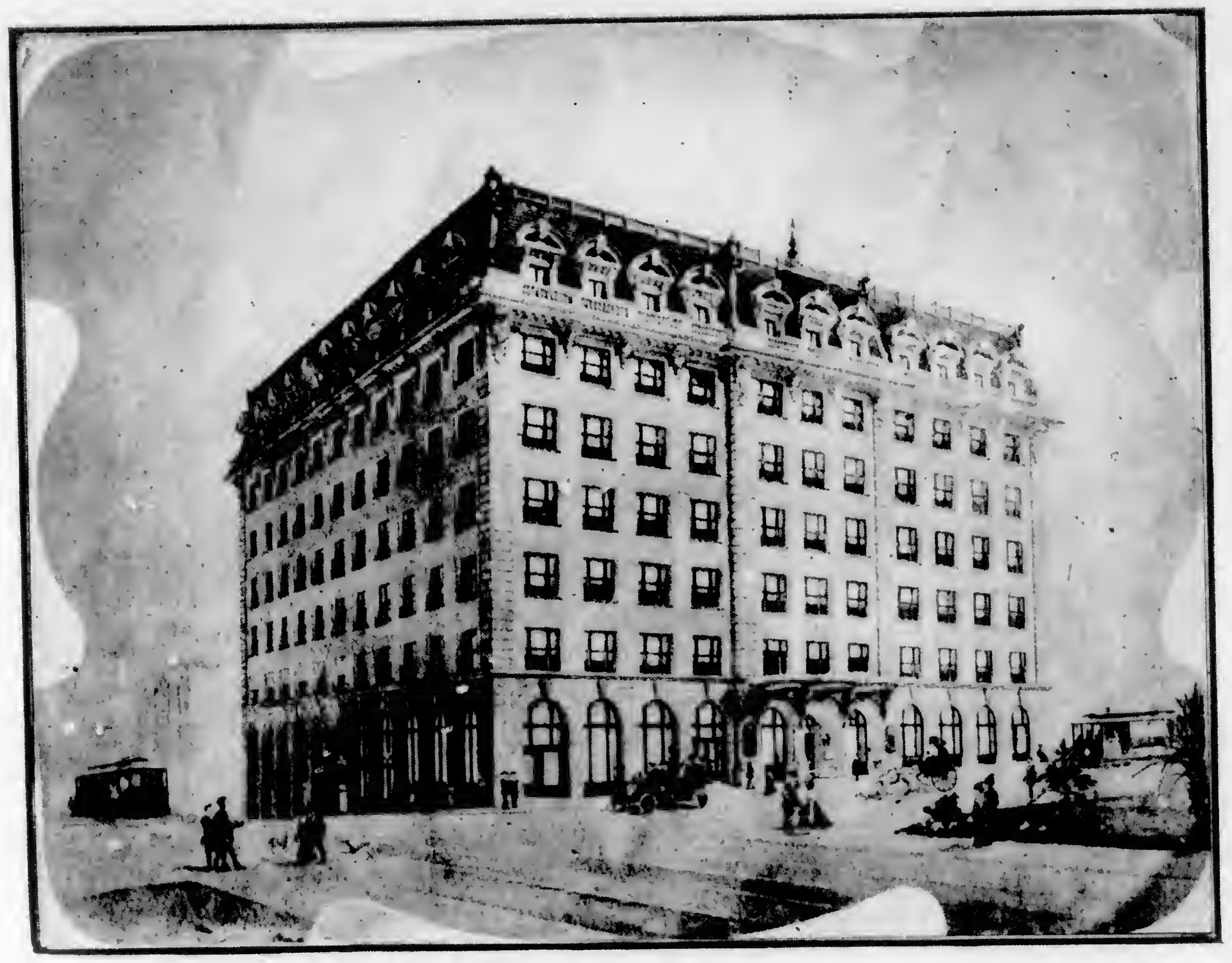
If it is to be read at all, a catalogue must be well printed on good paper and at least as attractively presented as the current magazines. The contents of the catalogue will vary with the line of goods presented, but should be limited to proper illustration, brief description without exploitation, prices where expedient, and such detailed data as will enable the specification writer to compare the articles. We believe ourselves capable of choosing a line of goods, an article, or a type, without the advice of the catalogue: The manufacturer or jobber, employs salesmen who know the merits of their productions, and can skilfully exploit them.

There is no excuse for advertising by means of the catalogue. I believe it to be a waste of ink and paper. Personally, I spend as much time, as a conscientious reader, with the advertising pages of my magazines, including the Architect and Engineer, as with the text, and I get all the matter of this sort that I can readily assimilate, and at the same time, think I am keeping up with the progress of current improvement.

Now, if having devised a catalogue, that from an architect's point of view, is worth publishing, it is ready for distribution, much discretion should be exercised in this particular. To scatter expensive printing broadcast, without regard for its use or by whom received, must be paid for out of the profits on the goods sold, which is to say, at the consumer's expense.

Those publications that are to me most nearly satisfactory, I am willing to ask for and to give receipt to the sender, while those that are useless advertisements and of impossible value and bulk, come unsolicited, and soon find their way to the furance room.

A comprehensive index of the catalogues and samples in the specification room is important, but to most men except a trained librarian, is practically impossible. It is easier to arrange the books on hand according to the contents, segregating them as to class, and arrange the classes most conveniently, whether by alcoves, alphabetically, or according to frequency



Bellevue Hotel, San Francisco
Baxter Marble Company's California Marble used Exclusively in this Building

of use. Here we are again reminded of the disadvantage of the various sizes at hand.

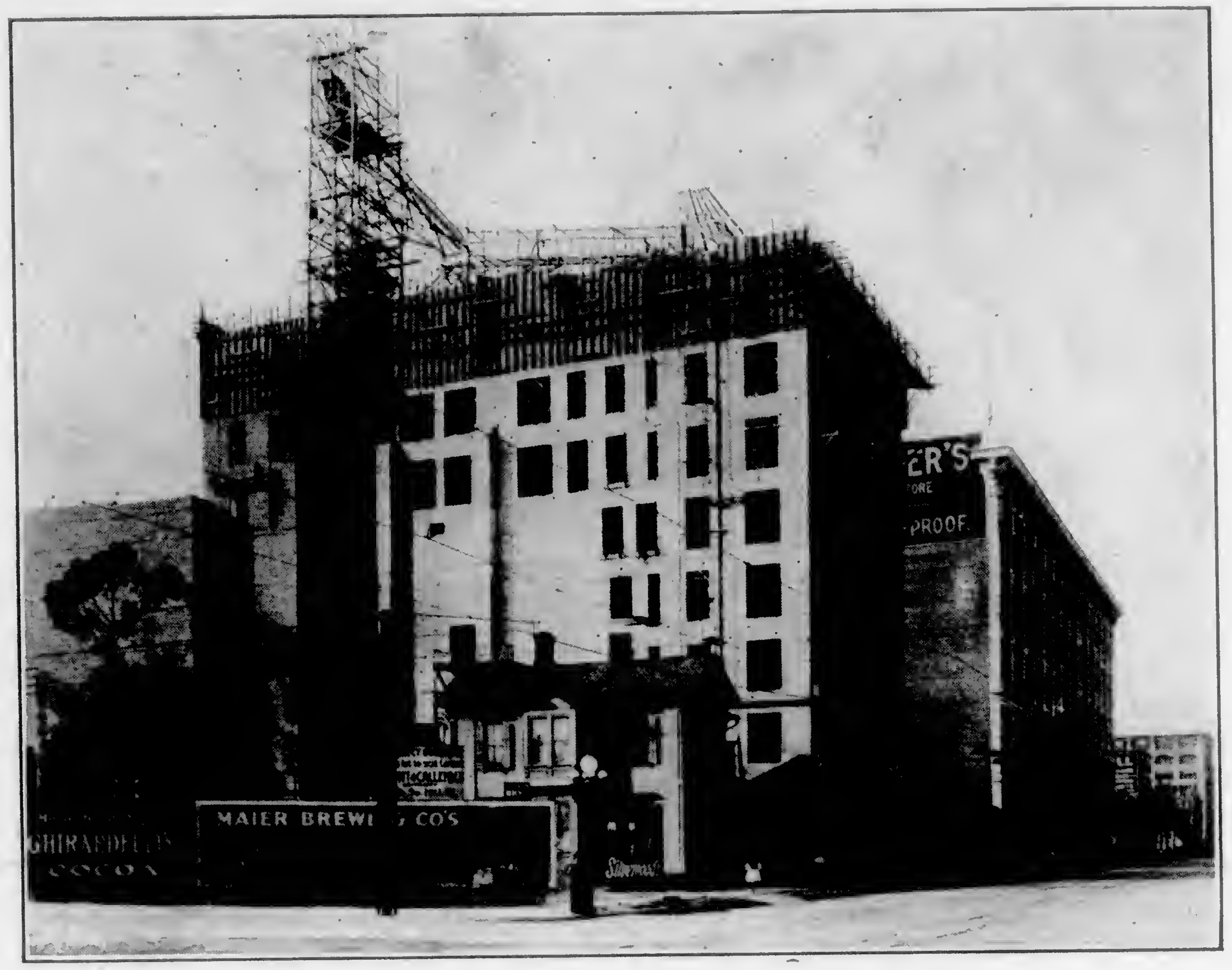
In conclusion: Catalogues to be acceptable, should be nearly uniform in size, to admit of handling, accessible filing and convenience; should be well and neatly printed, containing such engravings as are necessary to illustrate the style or construction and operation of its articles; brief description, with prices, such formulae as may be required for any calculations needed; and should be reasonably limited in distribution.

They should not be expected to take the place of salesmen; they should not be filled with jungles of literature; they should not be merely advertisements; they must not be cheap or shabby, and they should not be any old size the printer may make them.

It seems to me that the problem might be well and profitably settled by some capable and central printing establishment taking over the design and publication of a great number of trade catalogues, using the material to be furnished by manufacturers, edited if necessary, reducing to convenient size, perhaps combining several lines into one volume, and eliminating the objectionable features of indiscriminate publications. A catalogue trust in every good sense.

* * *

"I like to read American advertisements. They are in themselves literature, and I can gauge the prosperity of the country by their very appearance."—William E. Gladstone.



Hamburger Theater Building, Los Angeles, showing Gravity Tower Extension from Ground Floor and Wallace Hoist in Operation

Placing Concrete by Conduit

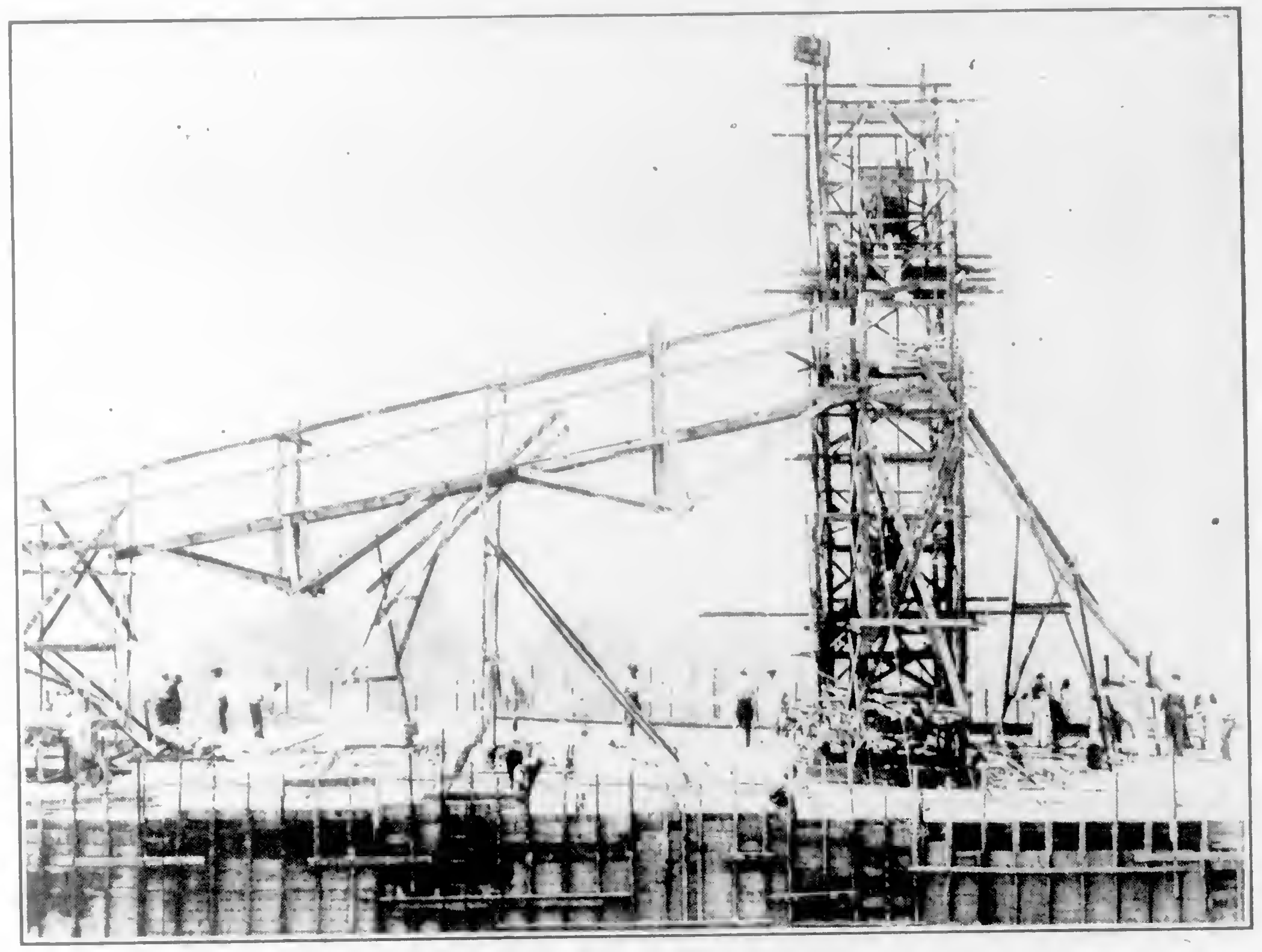
By HOWARD F. JOHNSTON

THE practical application of concrete to general construction work, as we of the twentieth century know it, is admittedly narrow but we are beginning to realize what a big thing it is destined to become. We often lean too confidently on finely drawn theories of science. We forget that practical experience sometimes teaches best even though that working proof opposes the laboratory test or the logical sequence argument of the brilliant scientist.

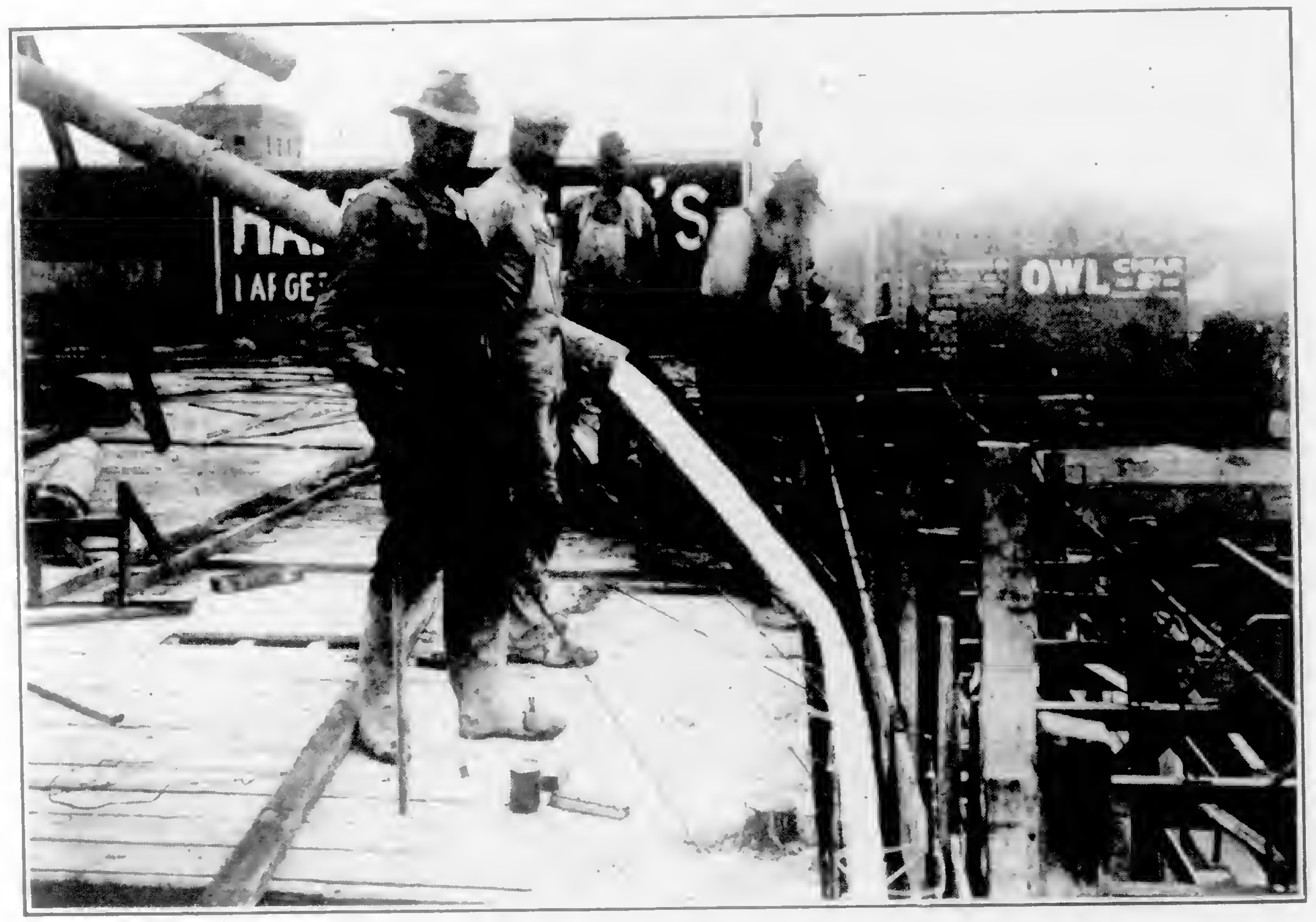
The man who, each hour of every working day, shoulders the responsibility of superintending concrete construction is placed where he needs must experiment by a practical try-out of every suggested working improvement.

Many accepted authorities have been telling us in effect that we cannot place concrete by conduit without disturbing the original mixing, that unless the pipe used be kept closely packed with mixture and forced through at an unvarying speed by even pressure, the crushed stone would shift more or less.

So be it. But during the past three months a concrete building has been in course of erection, under the writer's observation, in Los Angeles on which a gravity conduit system with a loose flow has been successfully employed. This structure is reinforced concrete throughout from cellar to roof and every yard of mixture was placed by gravity through eight-inch piping.



Hamburger Theater Building. Los Angeles
View of Working Floor, showing Hoist, Gravity Tower and Distributing Pipe



Hamburger Theater Building, Los Angeles, showing the Concrete Running into the Forms

It might be said that time is necessary to prove the rigidity and durability of any concrete job and so it is, but it is pretty safe, too, to pin one's faith to the opinion of the practical construction man.

Mr. S. W. Ehret, superintendent of construction for the Engstrum Company of Los Angeles, is a man of conviction with the courage to fly in the face of convention for he has found the exact consistency of mixture necessary to permit the concrete to flow freely and set properly when placed without any relative change in the batches of mixture.

The secret of success evidently lies in the mixing and in the continuity of movement of each batch from the time it leaves the mixer until placed and tamped. This is gained, of course, only by skillful manipulation and watchful care with every appliance to avoid a hitch, once having begun to turn the wheels. On the Engstrum contract, recently finished in Los Angeles, the Wallace mixer of a half-yard capacity, together with the concrete hoist of the same capacity, made by the Wallace-Lindesmith Hoist Company, was used throughout.

The gravity tower was built from the ground and was projected half over upon and with half of its support resting on the working floor. The hoist, operated on a vertical T rail track, was attached to the outside of the gravity tower at the top of which was placed a steel hopper operated with gate and switch attachment.

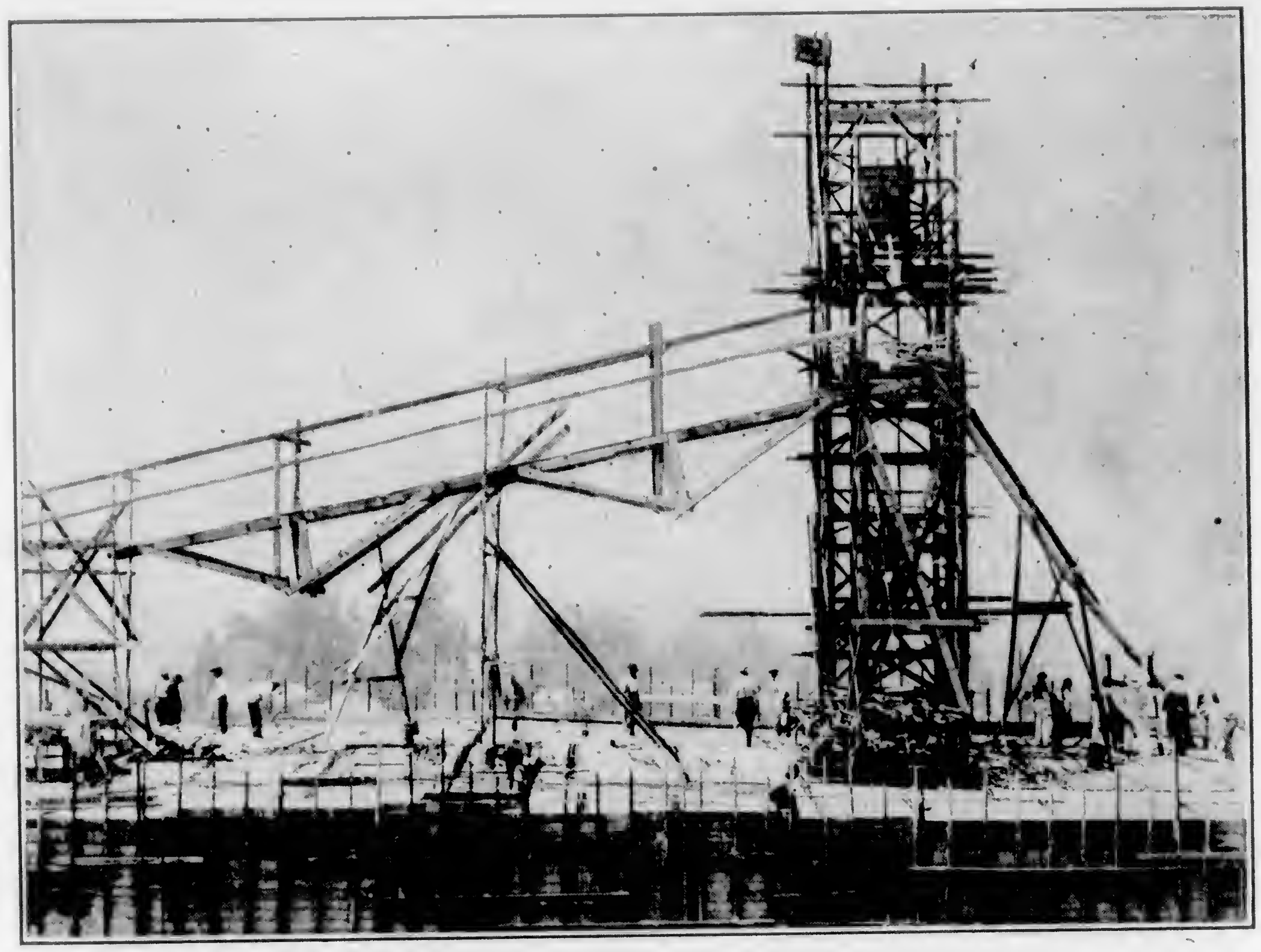
This gate was operated by a man who supplied every point on the job in turn as needed. The hoist raised its load with clock-like regularity, unloading and returning just in time to catch the next batch, properly timed in mixing. The hopper was never allowed to be empty. The mixture was kept in constant motion and a steady flow was maintained through the pipe.

Many crudities apparent on this job can be eliminated by future experiment. For instance, lighter shaft timbering and a more practical adjustment of conduit supports might be adopted. A hydraulic hose, in short lengths convenient for cleaning, would be better than the galvanized pipe used, but with all the handicaps of a novel undertaking, expensive last-minute changes and readjusting of operating plans, it is safe to say the contractors on this building saved from 20 per cent to 35 per cent in time and labor as compared to the cart and barrow system of placing mixture on the working floor.

* * *

A Substitute for Concrete

A composition resembling concrete, now being considerably used in France, and known as lime beton, is described as being more generally used than concrete. It is a cheaper composition than cement beton, or concrete, easier to work, and if the initial load be not too great it is for nearly every purpose just as good. A good lime beton can be obtained by mixing mortar and stones, gravel, or cinders, mortar and good-sized stones making the best composition. Probably one-half of the houses in Marseilles have been built of this material, and thousands of the older buildings, many hundreds years old, are held together by ordinary lime. Walls built of quick-lime beton must be laid up slowly, but with hydraulic lime beton they can be erected as fast as masons can work. The solidity of lime beton construction is shown by the sea walls and docks in Marseilles, where masonry of this kind may be seen both above and below sea water, the most difficult test to which building material can be subjected.



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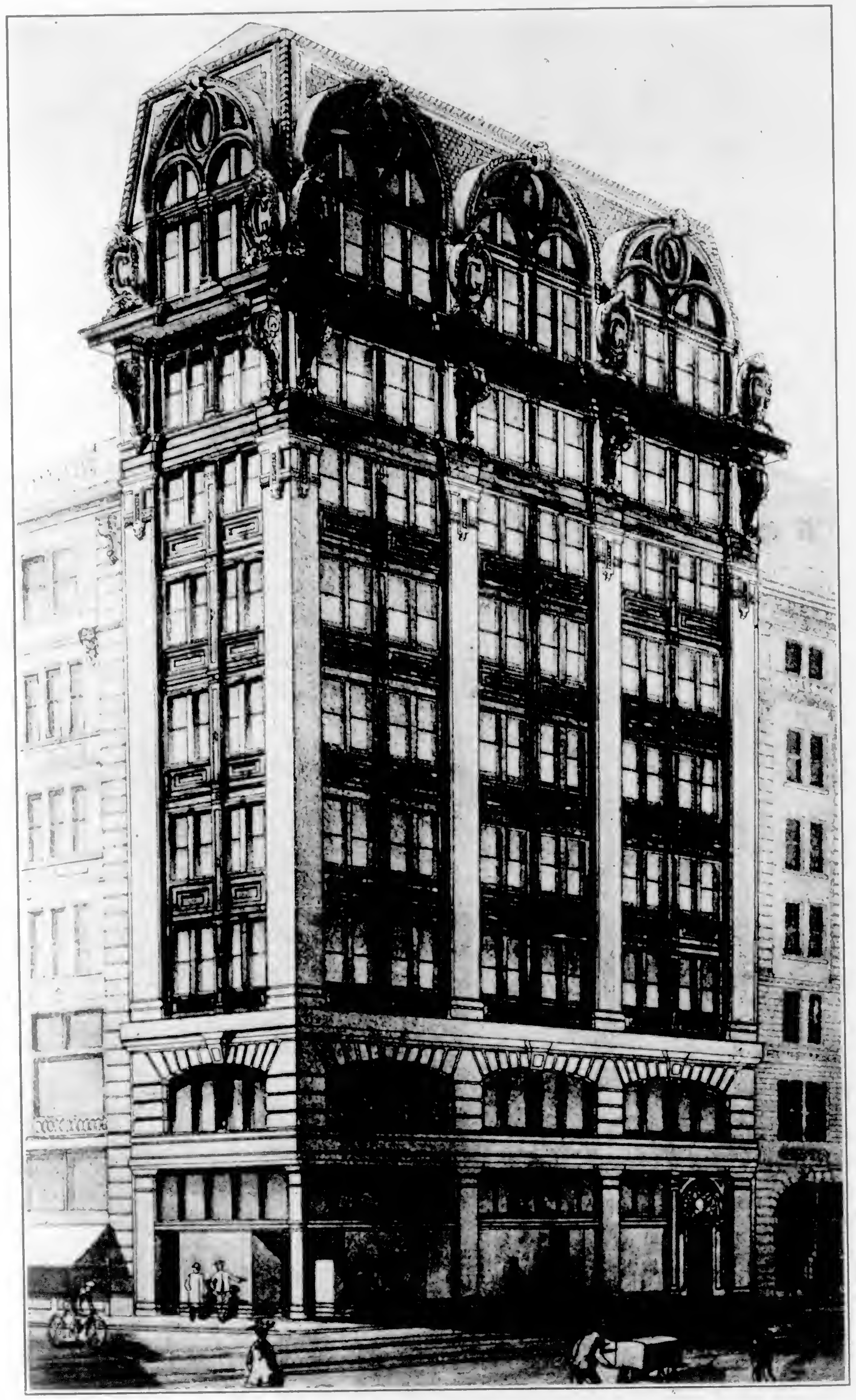
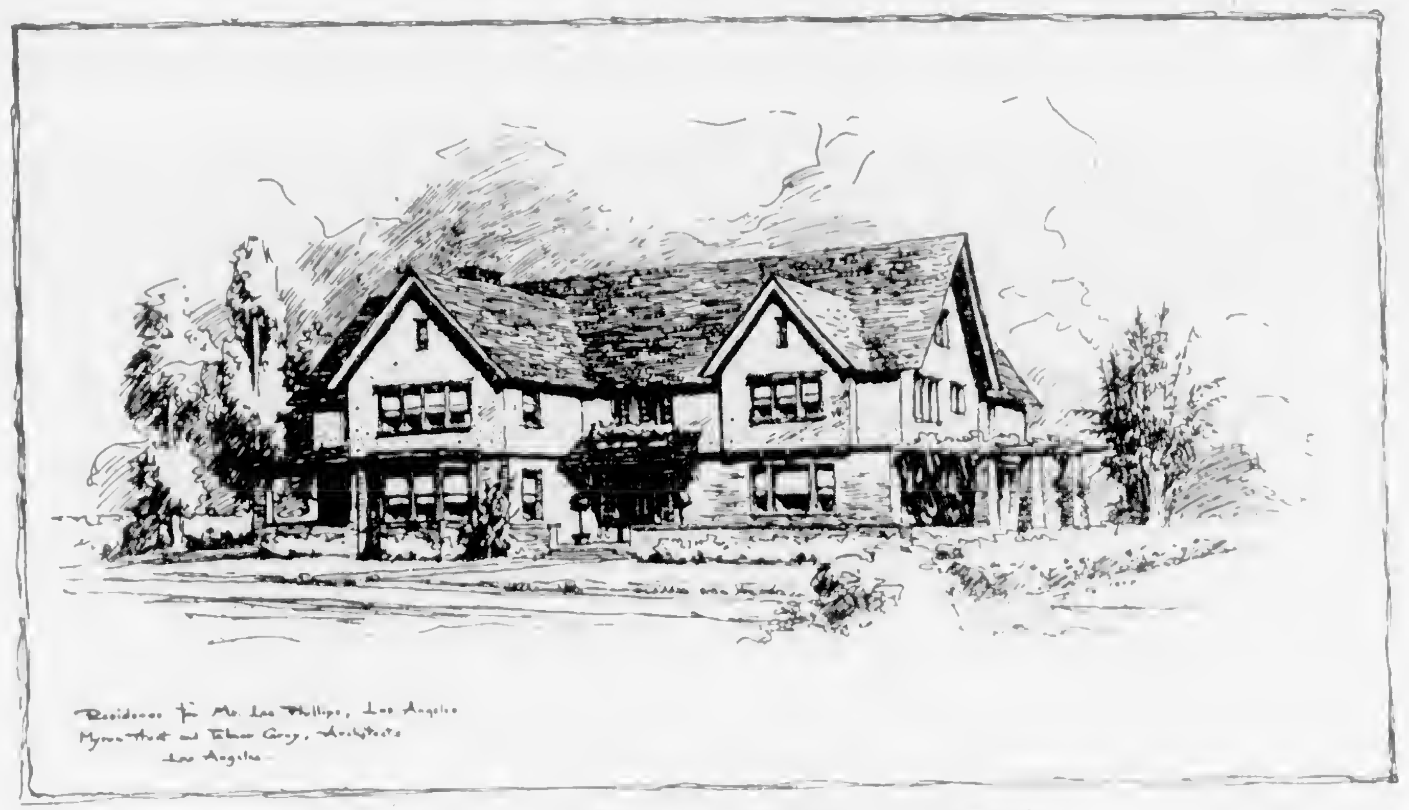


Gunst Building, San Francisco
Equipped with Otis Elevators and Hausmann Window Carriers
Landsburg & Joseph, Architects


Residence for Mr. Leo Phillips, Los Angeles
Myron Hunt and Elmer Grey, Architects
Los Angeles

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The Los Angeles Architectural Club's Annual Exhibition

THE Los Angeles Architectural Club held its second annual exhibition in the Associated Arts hall, May 20th to 29th. It was an unqualified success, and the attendance was even larger than was anticipated. Miss Emily Rutherford was in charge of the exhibition, which embraced some of the more recent works of well-known Southern California architects, painters and sculptors. Among those whose work contributed to the success of the exhibit were Harrison Albright, R. Mackay Fripp, Robert D. Farquhar, Green & Green, Hudson & Munsell, Myron Hunt and Elmer Grey, Otto Jansen, Arthur R. Kelley, Kelley & Newberry, Little & Brown, F. X. Lourdon, Carl Enos Nash, Neher & Skilling, Parkinson & Bergstrom, W. A. Sharp, A. Sterling Calder, Miss Emily Rutherford, C. H. Baker, I. J. Gill, Train & Williams, and others.

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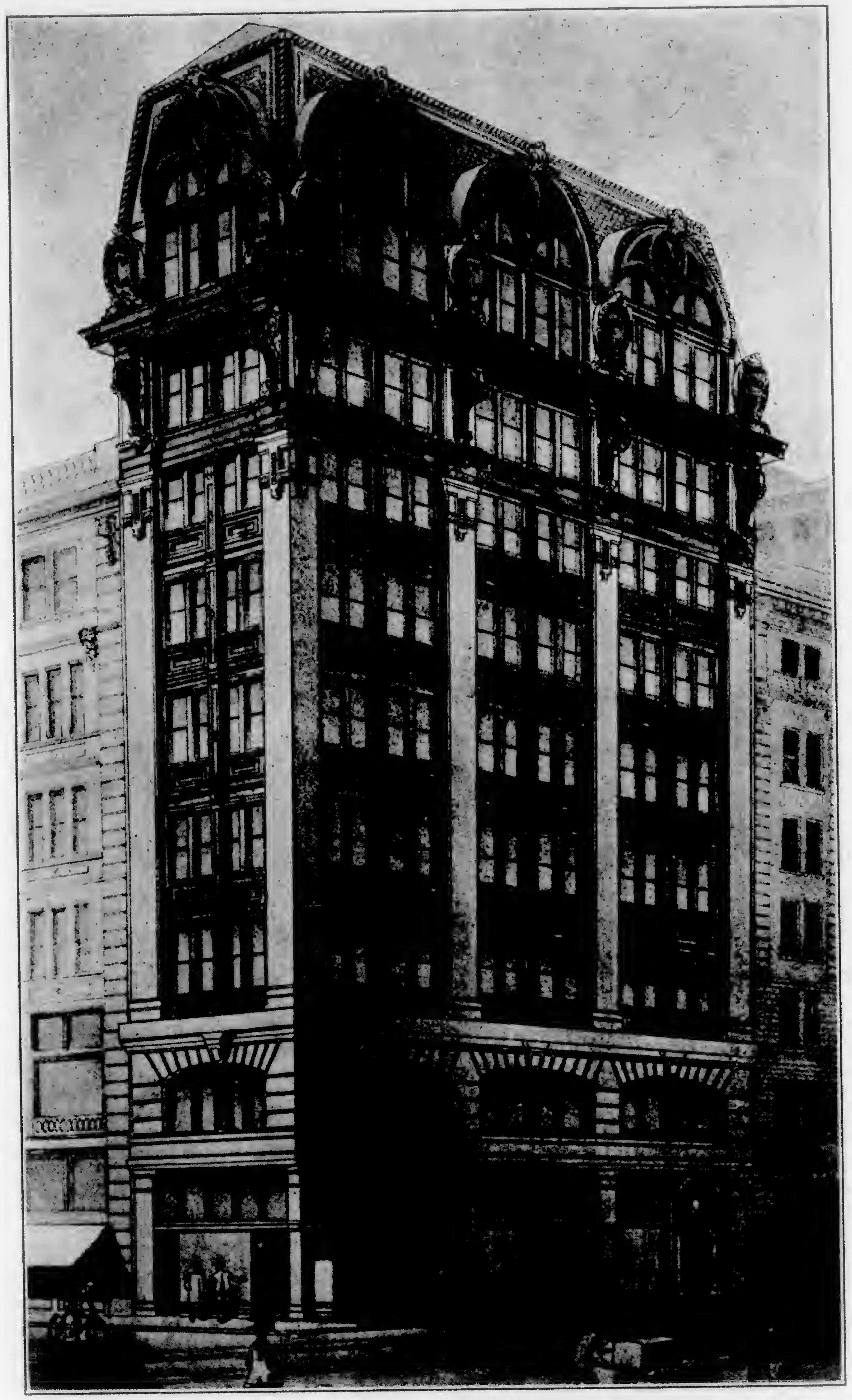

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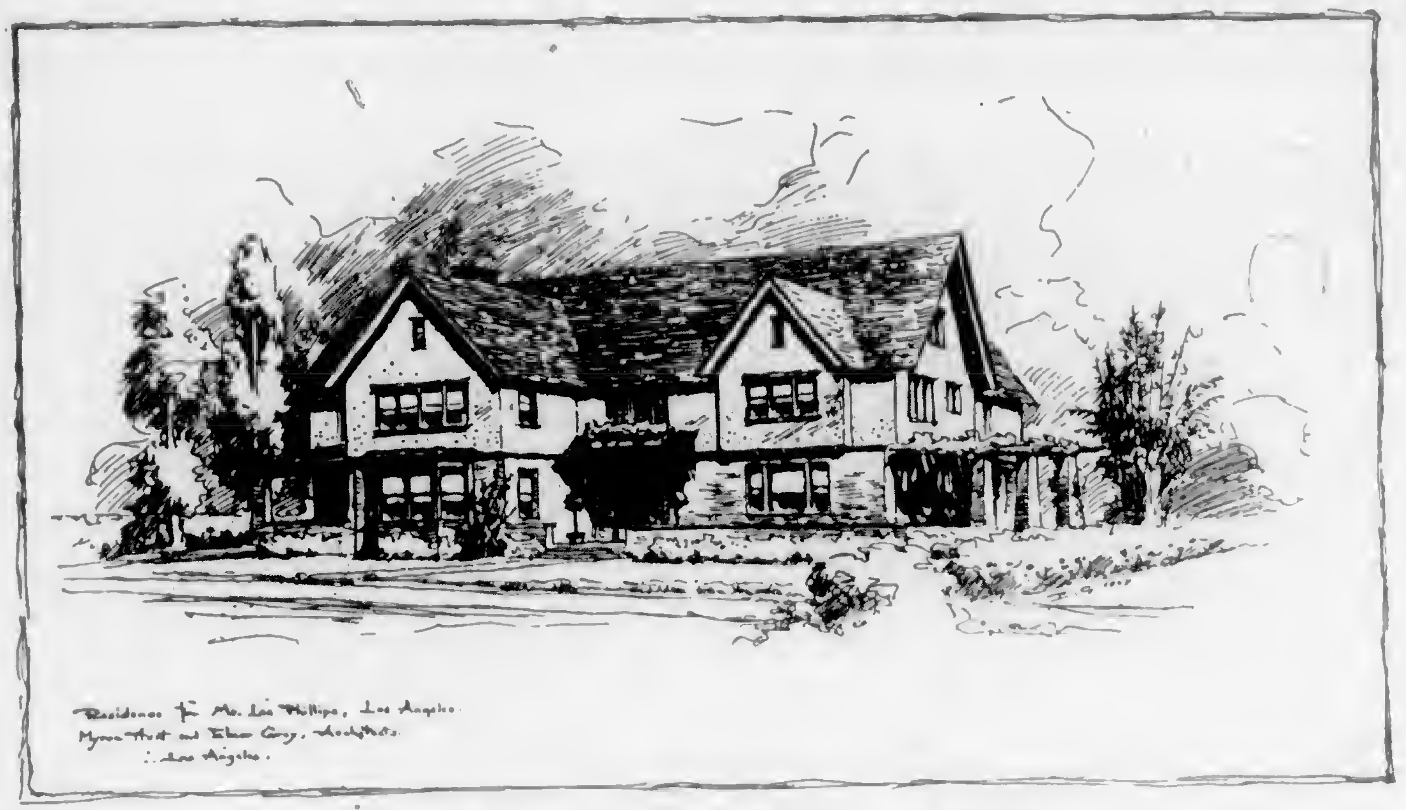

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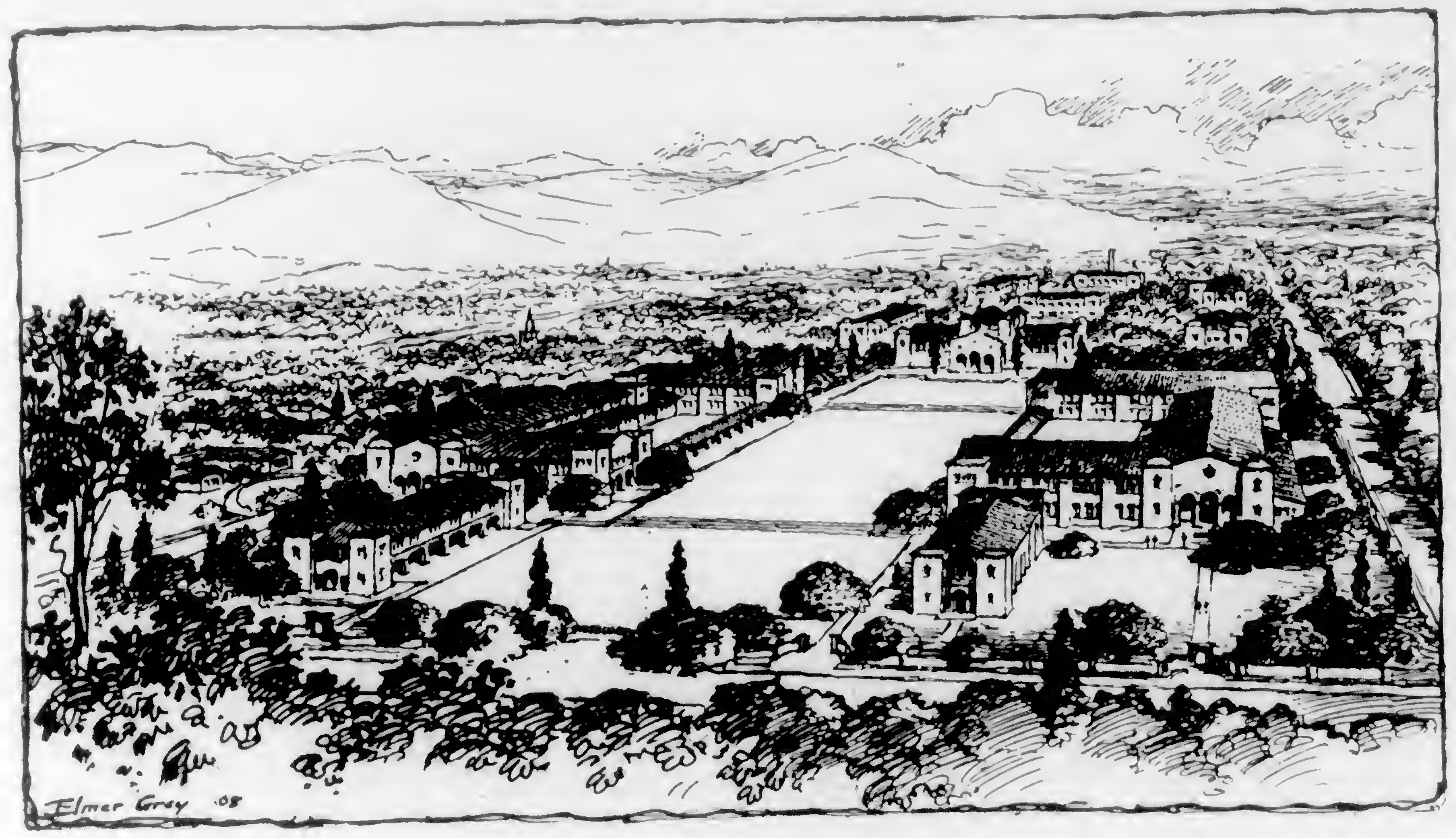
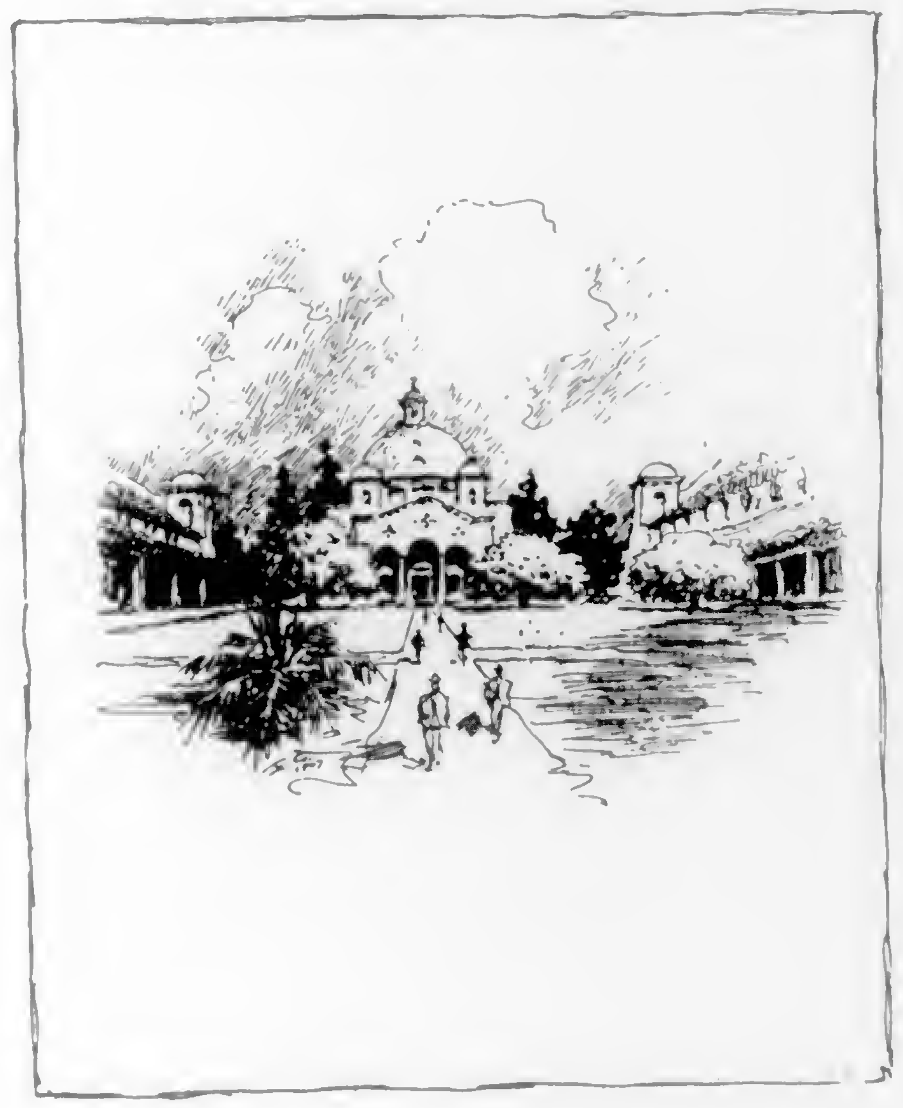
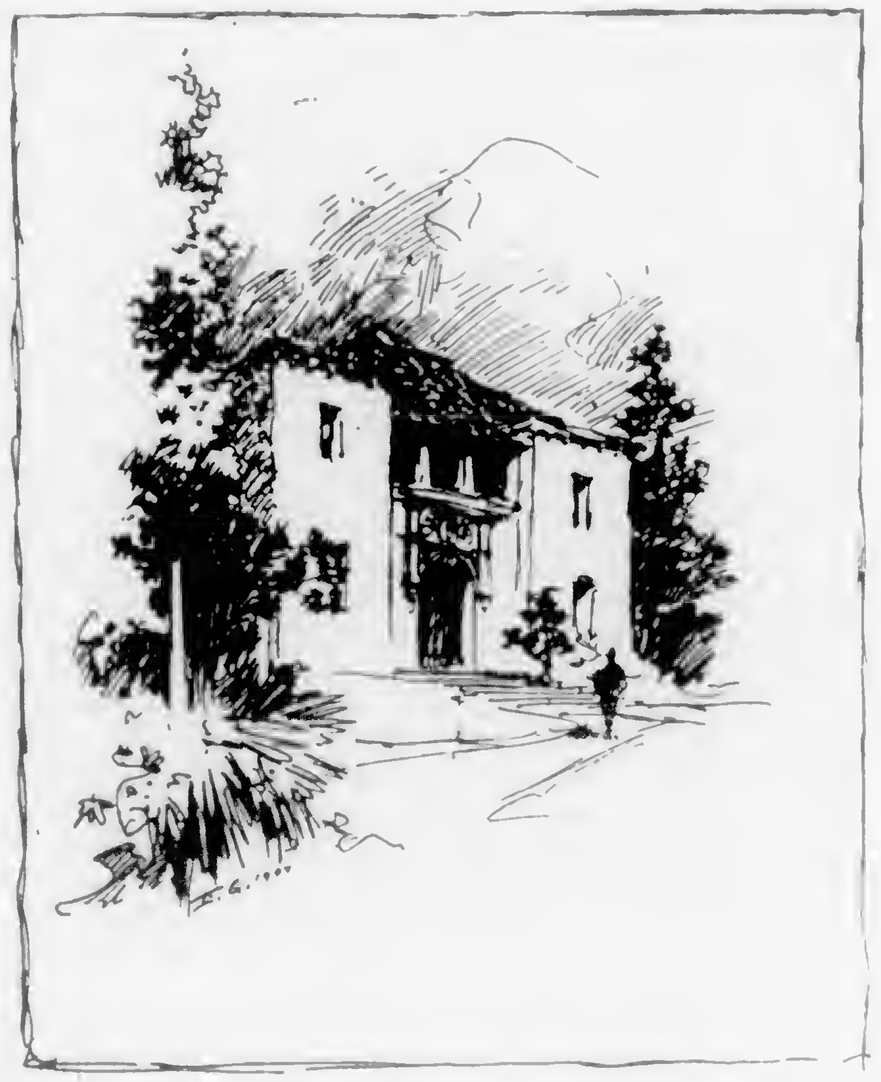


Throop Polytechnic Institute, Pasadena
Myron Hunt and Elmer Grey, Architects

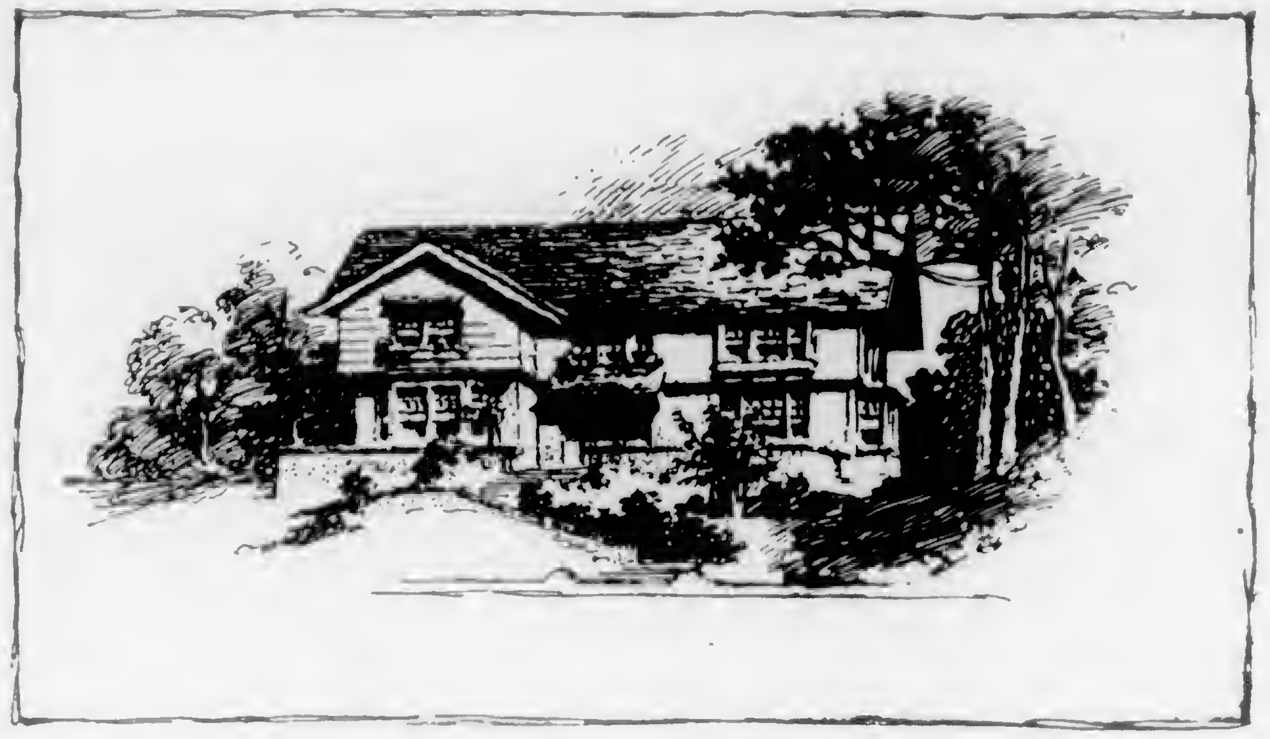


Campus Looking toward Administration Building



One End of the Physical Laboratory

Myron Hunt and Elmer Grey, Architects



Residence of Dr. A. L. Macleish, Los Angeles
Myron Hunt and Elmer Grey, Architects

A Concrete House Dream

"YOUR concrete house proposition amuses me more than anything I have seen in America," said Mr. W. W. Dunwood, of Manchester, England.

"Now, you propose to build a mold of metal and duplicate all of the houses from this original mold. What a jolly looking country you will soon have. The railway trust, I can see, for example, will in time buy a depot mold and it will turn out one hundred thousand depots and plant them around the states. They will all be precisely alike.

"Then you will have contracting firms which own molds for special houses. All the seven-room houses in all the states will be the same.

"This might not appeal to the Italian or the Frenchman as extremely artistic, but I can see one advantage. When a man lives in a seven-room house in Indiana and suddenly switches out to California he will feel quite at home, and his furniture will fit, and possibly even the house cat will think it her old Indiana homestead and not even bother to return to her native state.

"All your barns, garages, municipal buildings, postoffices, jails, etc., I suppose will be alike. The idea is delightful, and so thoroughly American and original!

"It will also save visitors from Europe lots of trouble. They can visit only one city, and when they return home they can safely talk about any American city which comes up for discussion."

* * *

Fireplace Suggestions

"Mistakes are sometimes made by inexperienced persons in building the fireplaces which are coming into such favor again," said a builder. "The people find that the fireplace smokes and is susceptible to every vagrant breeze that happens to blow down it. The reason for this is a fault in construction, a disregard of a fundamental law and a principle well known to most builders. The fireplace has not been provided with a proper 'throat' and 'smoke shelf.' Some people have the idea that the bigger the chimney the better will be the draft, and they build the chimney large and of the same size throughout. The throat should be a few inches above the arch of the fireplace and should be comparatively narrow. The part of the chimney wall which juts in to form the throat is called the shelf and when a wind blows down it provides a shelf against the breeze so that the smoke does not blow out into the room."

Now the Best Time To Build

SILENT workshops, idle crews and dust covered piles of merchandise in the warehouses mean stagnation for any country. The degree of stagnation is determined by the completeness of the closedown. A state of idleness appeals only to those whose vision is blurred and whose mind is distorted by false education.

The science of merchandising applies to the buying of labor and building material just as truly as it does to purchase of goods sold across the counter. Well bought not only is half sold but if unsold means an extremely good investment. To buy well is to buy at an opportune time—to have on hand goods that are in demand, whether the price paid be high or low, or to buy at or for less than cost of production; in other words, for less than the recognized fair market value.

It may be economical to pay a man $6 a day during a rush season in order to complete an unfinished piece of work. If this wage be far above the scale, such expenditure is not, however, justified at all times. Business men must compare the outlay with the returns.

It is possible now to secure more and better work for the same price than at any time within the last two years. Materials are cheaper; labor is cheaper, anxious for employment and earnest in its desire to give full value. These certainly are factors which the wise investor should take into account.

Buildings put up for investment yield not to exceed an average of 8 per cent. By building at this time investors should save 10 to 20 per cent on the cost as compared with the cost in 1907 and the outlay that probably will be required next year. This is equivalent to the earnings on the investment for the two and a half to three years.

It is admitted, of course, that the demand is greater when prices are highest, and in turn prices are high because the demand is great. Humanity has one characteristic in common with sheep, and that is each requires a leader. Frequently the excuse Brown gives for building is: "Well, Jones is a shrewd fellow and he started to build; if it is a good thing for him it must be a good thing for me." In point of fact what may be good for Jones may prove otherwise for Brown.

Each individual should consider his own resources and scan closely every possible advantage. His determination to do or not to do should be formed not because of the activity of someone else but upon his own initiative.

A word in regard to lumber prices: Values necessarily will show fluctuations in the future. Sale prices will move up and down in response to heavy demand or its temporary restriction. The lumber trade of the country and the lumber consumers of the country should remember, however, that a steadily increasing demand is being filled from a constantly decreasing supply of timber. The inevitable outcome of these forces working one upon the other will be a higher price level. The history of years past shows that each decade has its high and its low prices, but the low prices of 1900 to 1910 will be about in line with the high prices of 1890 to 1900. There are possible exceptions, but few people have the opportunity to profit by the exceptions which in substance mean the sacrifice of someone's else property to satisfy pressing claims.

Lumber, brick, stone and other materials necessary to the construction of buildings, purchased and put into place at this time, will be worth in the new relation they bear one to the other a great deal more a year or two from now than the present cost. Furthermore such structures will be ready for use.

Elevator Enclosures in Pacific Building, San Francisco
Chas. F. Whittlesey, Architect. Executed by the White Ornamental Iron Company

Popularity of Brick Paving

THERE is an interesting showing of the popularity of brick for paving in a recent number of Municipal Engineering where the statement is made that up to the first of December the contracts for brick paving entered into during 1907 show the following very satisfactory amounts: Ohio, 1,290,000 square yards; Illinois, 765,610; Indiana, 606,301; Michigan, 426,991; Wisconsin, 210,188.

This makes a total of 3,299,095 square yards of brick paving contracted for in these five states in eleven months of 1907. It is estimated that the December reports will increase this nearly to 4,000,000 square yards. Many cities were slow in preparing their work for letting contracts and consequently there was a little difficulty in getting prompt deliveries of brick toward the end of the season, but this will not interfere with the letting of contracts for the new year.

It would be far better for municipalities if they would prepare their contracts for letting during the winter season, so that the contracts could be let at the beginning of the construction season. Materials are then easier to obtain and usually cost less, the work can be better done during the warm season and the hurry and consequent poorer construction on account of the desire to finish up late contracts in the fall will be obviated. Municipalities will get better results, contractors will have easier work, the manufacturers of material will be able to anticipate their deliveries so that there will be evident advantages to all concerned by early action of the municipal authorities regarding their improvements for the coming year.

Some Answers to Queries

Insurance on Concrete Block Structures

TO THE Architect and Engineer of California: I wish, if possible, that you would consider the following article, and give space in your magazine to cite other cases to the contrary. In our city, and I suppose we are merely one of many, the insurance companies rate us on concrete block structures the same as if it was constructed of frame. I inquired of one of our local agents why this should be the case, and he was unable to answer with authority, but showed me the following article which originally appeared in an insurance magazine called "The Review":

"The increasing use of 'patent stone' for building material in the Southwest has led the Kansas Fire Prevention Association to make a report on its fire-resisting qualities. The facts are gathered from a recent fire at Geary, Oklahoma Territory. The patent stone building burned was constructed of blocks 30 inches long, 10 inches wide and 9 inches high. Each block has two hollow spaces 4 inches by 10 inches. Eye-witnesses state that as soon as the roof got to burning well, the walls commenced to bulge and the blocks fell apart with reports like pistol shots, one-half of the blocks going one way and the other half the other. Toward the rear was a portion of the wall about ten feet high on the south side, and the entire rear wall up to the second story was left standing. However, the stone in every block, including those next to the ground, as well as those higher up, was completely disintegrated. The portion of the wall still standing was badly cracked and absolutely worthless. Not a drop of water was thrown on this building at any time. The owner of the building stated that he found it necessary to coat the entire outside of the patent stone with cement, as the stone absorbed so much water that the paper and inside finish would peel off after a heavy rain. It is stated that the blocks used were constructed of one part Portland cement and five parts sand taken from Sand Creek, which is a round pebbly sand. The inspector gives his conclusion as to the fire retarding qualities of this stone, that a building of this construction should be put in the same class with brick veneer."

If you will answer the above it will greatly oblige,

Very truly yours,
S. T. MILLAR, Architect.
Box 258, Albuquerque, N. M.

The insurance companies, or rather the Underwriters' Board, are inclined to look upon the fire-resistant qualities of hollow cement building blocks with a none too favorable eye.

In this they are in a measure justified. Fire tests on one-piece hollow blocks demonstrate that under unequal heating, there is a tendency in the webs of the blocks to crack, or part from the other portions, especially when the webs are relatively thin.

There is no end to the variety of block-making machines, and the product resulting may be good, bad or indifferent as the type of machine, quality of aggregate or skill of the maker may determine.

The general disfavor with which cement blocks have been held by the architectural profession and the general public is in no small measure due to the policy of the less reliable makers of machines who, in their haste to dispose of their product, have fostered the idea that anyone, anywhere, with any sort of aggregate and no experience can manufacture satisfactory building blocks. No greater fallacy ever existed in the building trade, and to the credit of the more reliable dealers, be it said, this line of action has been stubbornly resisted. Papers circulating among the smaller communities and the mail order catalogue contain glaring advertisements of a fortune made in a few minutes with a $15 block machine in the corner of the back yard. The reputation of the good suffers from these faults of the bad, and when some structure, the product of one of these door-yard propositions, collapses, as might be expected, the result is a general condemnation of all similar types of construction.

Any one interested in concrete and cement building blocks should get in touch with the United States Geological Survey's testing laboratory at Forest Park, St. Louis, Mo., where there is in process of completion the most thorough investigation ever made upon these subjects. The bulletins issued from this source are a mine of information.

In regard to the report cited above, upon the fire at Geary, Oklahoma, little can be said without a full history of the manufacture and placing of the blocks. There must have been an excessive percentage of voids in the concrete, and such being the case it is hard to understand what could have caused the blocks to "fall apart with reports like pistol shots." It would seem from the face of the report that some of the "eye witnesses" also "exploded" as well as the blocks. Perhaps the excitement of dodging the flying fragments of the blocks contributed to this deplorable result.

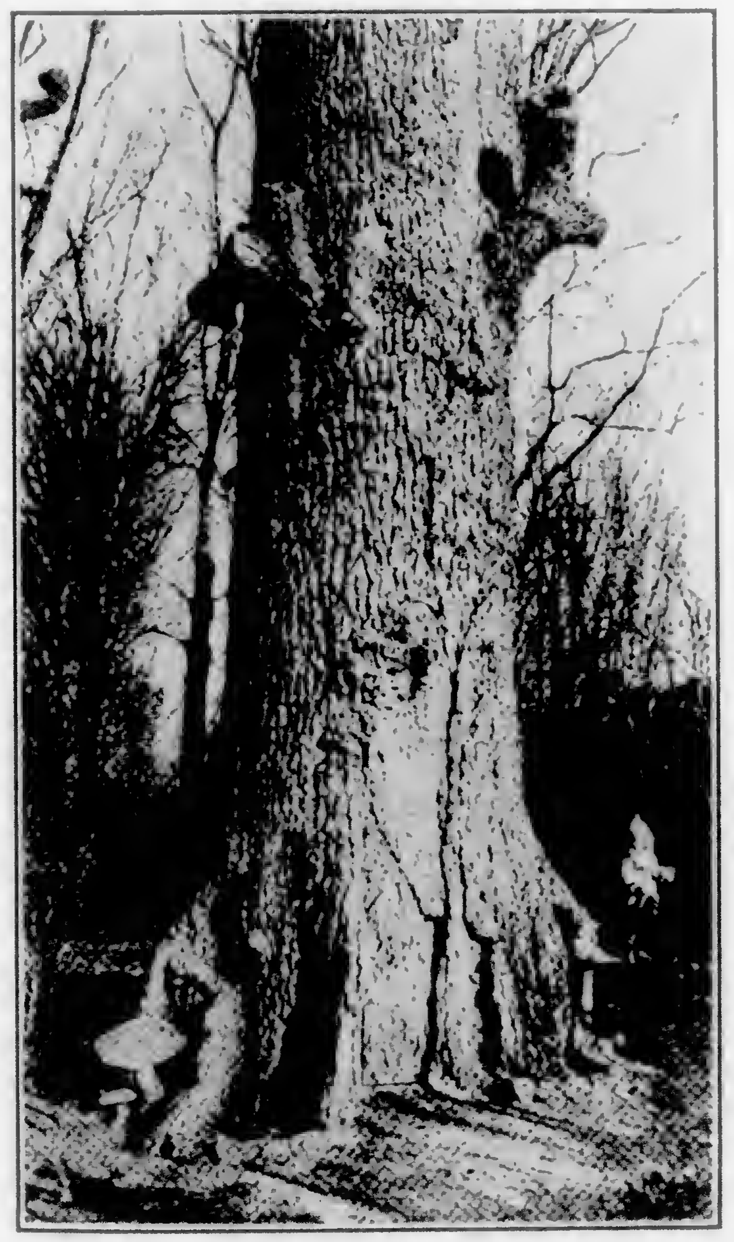
G. B. ASHCROFT, C. E.

* * *

A Concrete Tree Chimney

THE accompanying photograph is not a picture of an ordinary tree, but one of the most novel and unique applications of cement extant. What appears to be an old monarch of the forest is in reality a reinforced concrete chimney for an electric plant at Verte Monte, Malmaison, France, on the estate of Edward Tuck. The owner was reluctant to erect a tall stack on this timbered track, and devised the concrete tree in order that the harmony of the scene might not be disturbed. It is quite common to fill decayed places in trees with cement in order to preserve them, but the casting of a whole tree is a far greater achievement. The arched door at the base of the concrete tree is indicated by a delicate line.

Concrete has been supplanting wood for a number of years, but this is probably the first instance where timber has been reproduced in this original form.—Cement Age.



A Concrete Tree used as A Chimney, Illustrating Novel Use of Cement

A Soundless Room

THE following, clipped from a recent issue of the New York Sun, while interesting from a scientific standpoint, is not, we believe, so much a "dream of nervous temperaments" as the writer believes. From excessive noise to an absolute quiet, such as is described, is from one extreme to the other, both of which are equally nerve destroying.

Given a means of diffusing or blending sounds so that the result might be a murmur, so to speak, or what would be a mean between the two extremes, then the nervous might really hail the result as something long desired.

"A soundless room, one from which it is possible to exclude external sounds, is a dream of nervous temperaments. It has been realized in fact at the Physiological Institute at Utrecht; but as it is not possible to stay in the room for more than an hour at a time owing to the exhaustion of its oxygen the uses of it except for purposes of experiment are limited. No way of getting a supply of fresh air without at the same time letting in sound has been discovered.

"Its noiselessness is secured by placing it at the top of the institute, on a floor hardly at all used and by constructing its sides in a number of layers. The layers are:

"1. Trichopoièse, a felt-like material made of horsehair, and a very bad conductor and reflector of sound. This layer is covered with a net on the inner side to keep the hair from falling.

"2. Porous stone. This part of the wall does not rest on the floor, but is isolated from it by a layer of sheet lead.

"3. A dead air space.

"4. A wood layer.

"5. A mixture of ground cork and sand.

"6. A special composition of ground cork called Korkstein.

"The total thickness is eleven inches. The ceiling has eight layers; the floor is chiefly lead and carpet.

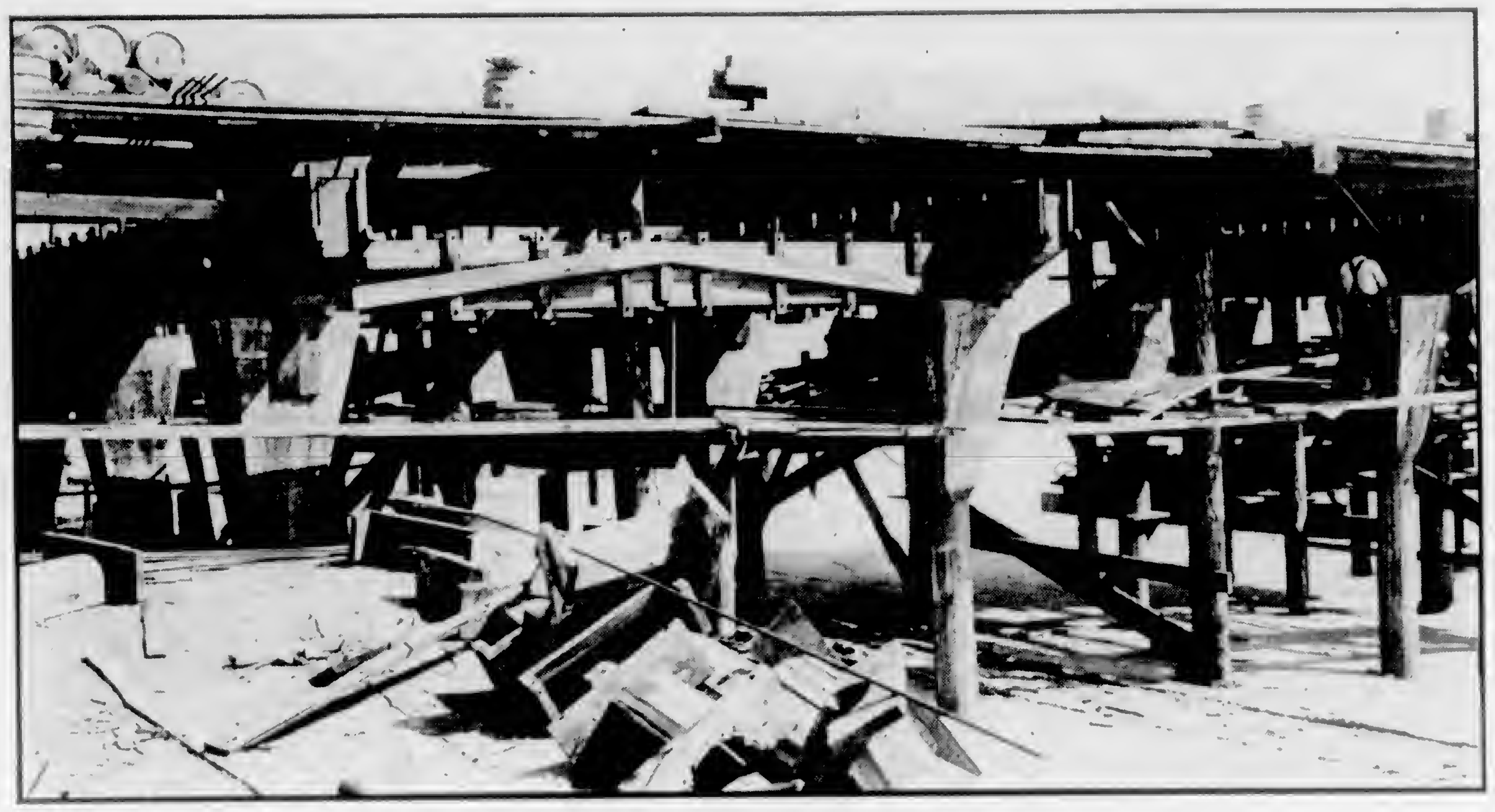
"The noiselessness of the room is first demonstrated by the fact that one hears a subjective buzzing, similar to that produced by taking a large dose of quinine. Most people can also hear their own heart sounds. The slightest movement of the body produces its sounds, so that when experiments are in progress the observers have to be careful not to move.

"Whatever sounds are produced in the room cease when the vibration reaches the wall; there is no reflection of sound. A shell held to the ear produces no sound. The tones for which the shell is resonant are absent."

* * *

Object to Revolving Doors

It is reported from Paris, France, that the Prefect of Police has issued an ordinance forbidding the use of revolving doors in restaurants, hotels and other buildings being capable of holding more than a hundred persons, on the ground that they are dangerous in the event of fire or panic. The storm door in late years has become very popular there, and numbers of them have been erected. These must now all be removed. The order has aroused the indignation of those who have installed them at great expense. The prefect's action was prompted by two or three instances of the door jamming and imprisoning the inmates of the buildings for a long time.



Building the Shoulders, Girders and Struts of Reinforced Concrete Piles at Santa Monica

Concrete Piling For Santa Monica Pleasure Pier

A REMARKABLE instance of the use of reinforced concrete may be seen at Santa Monica, at the foot of Colorado street, where huge reinforced concrete piles, each weighing five tons, are being cast and sunk into the sea. These piles are to form the supporting structure for the municipal pleasure pier being erected at a cost of about $90,000. It will also serve for carrying out into the sea the city's garbage after it has passed through the electric treating plant.

The illustrations presented by courtesy of the Southwest Contractor and Manufacturer, show the method of casting and also the finished piles sunk into position, built up, shouldered and made one with the superstructure.

This use of reinforced concrete is unique and in some features the only instance of its kind in existence. By many engineers it is regarded in the light of a very doubtful experiment. There has been much controversy over the action of sea water on concrete. Many instances are known where the concrete has disintergrated, particularly above the low water mark. An example of this may be found at Long Beach, where the concrete in time became pulverized, from what cause it has not been definitely determined.

The Santa Monica pier is to be 1600 feet in length, with ninety foot platforms every 500 feet. For the pier length alone, not taking into consideration the additional piles for the platforms, it will require 240 of these reinforced concrete piles. They are being cast on inclined planes as shown in the illustration, the lower ends resting at the bottom of the pit. Boards are laid from the bottom to top of the inclined plane, between the molds; there are stepped off to form ladders; facilitating the workmen in handling the molds and casting the piles.

The piles are cast in lengths of thirty-six to thirty-eight feet, the reinforcing rods being allowed to extend above the concrete, for the piles must be built up ten or more feet after they are sunk to solid bottom. Six ¾-inch rods are used for reinforcing; in the center of the pile is placed a 2-inch pipe through which water is forced as the pile is sunk, the heavy jet boring a hole in the sand and gravel for the pile. The base of each pile is enlarged to form a bulb, designed to give the pile a firm foundation after the sand has washed in around it.

In mixing the materials, tested Portland cement is used in proportions of one to six of coarse gravel and broken stone; the gravel is taken from the ocean bed and washed as clean of sand as possible.

After the pile is properly cast and ready for sinking it is carried to position, bulb down on the sand surface; connection is made between the center pipe and the pump, which furnishes a force of 180 pounds to the inch and 300 gallons of water per second. A pipe similar to the one in the center, is sunk free beside the pile; it is a very simple matter, after the pump is started, to remove the sand and gravel from underneath the base, and even stones measuring eighteen to twenty inches in diameter. So great is the perssure that only ten minutes is required under ordinary circumstances to place the pile in permanent position.

As the pile sinks, the free jet is revolved around it; should a boulder be encountered too large for removal the pile goes no deeper. Under the contract, the contractor must sink the pile to a depth of twenty feet, unless firm bottom is reached at a less depth; but he is allowed extra for each additional foot over twenty.

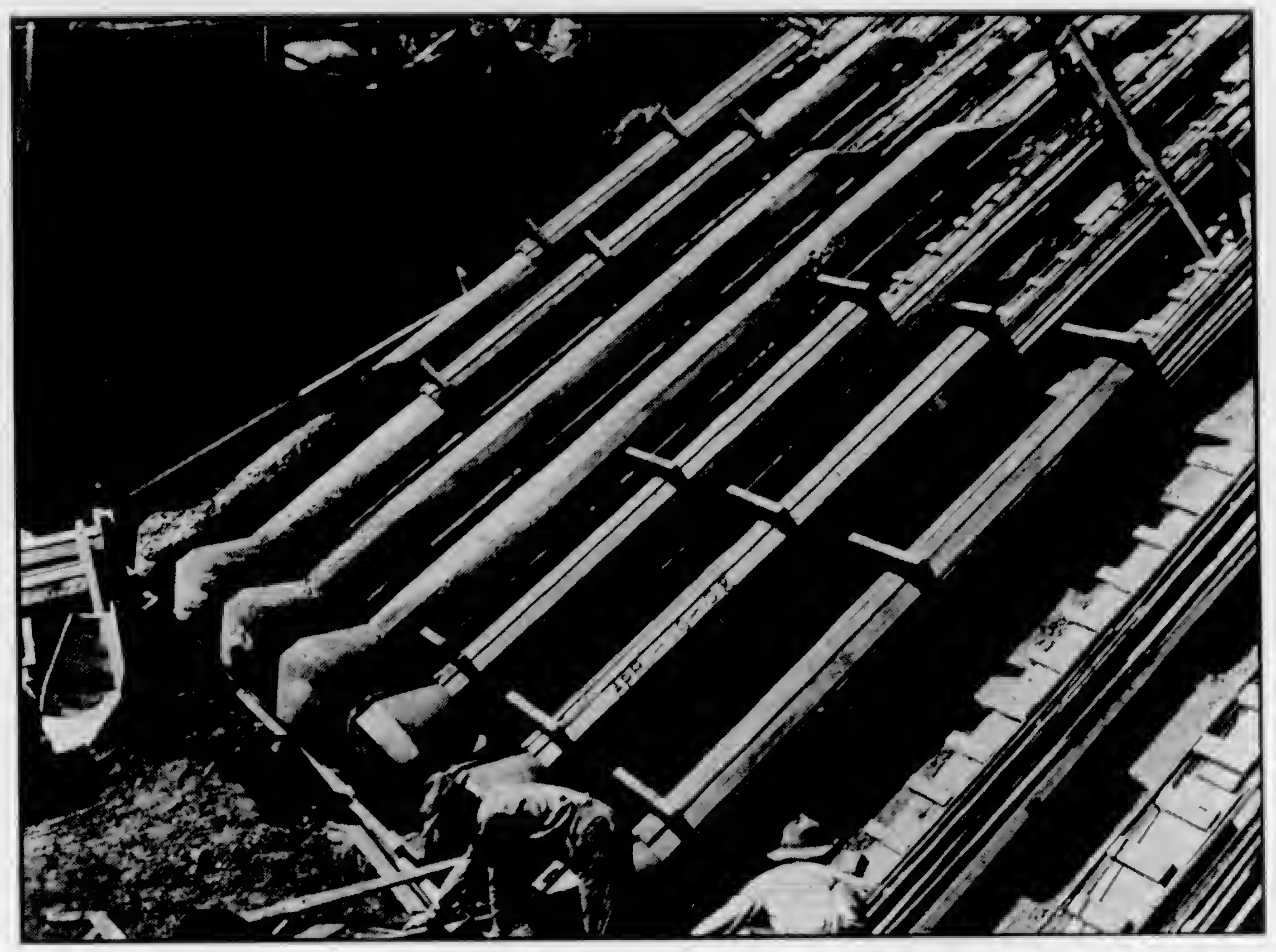
Each pile is sunk under the direct supervision of an inspector appointed by the city. This inspector makes a record of the number of feet the pile sinks and he determines when a proper foundation is reached.

Three piles are sunk abreast, laterally, at a distance of twelve feet apart; between each lateral row, longitudinally, is left a distance of twenty feet. After the piles are built up to the required height, the shoulders are constructed and then the 30-foot girders are molded; from girder to girder run three 18-inch struts. When complete the entire sub-structure is a monolithic mass. It was originally intended to use 14-inch piles, without protection, for the first 500 feet of pier, 18-inch for the next 500 feet and 22-inch for the remainder out to the end, where the water has a depth of 30 feet. But on account of the dangerous driftage not uncommon during severe storms, it has been decided to put iron castings on all the small piles nearer the shore. The wooden piers in the vicinity are constantly breaking to pieces, furnishing driftage that acts as huge battering rams with the force of a heavy surf.

The piles are sunk in varying depths of water; at the end of the pier where the water depth is thirty feet the pile length will approximate forty to fifty feet, for an average of fifteen to eighteen feet of sand must be pierced before a firm foundation is found on which to rest the pile.

The pier will be floored with wooden planks, surfaced with asphalt. The contract price is $86,000, although it is expected the total cost will exceed this sum. It is estimated the cost of construction would be about $15,000 if timber piles were used. The city, however, is attempting to build a permanent structure and is willing to spend the larger sum in the experiment. The pier will be completed in four months at the present rate of progress, nearly 200 feet of the structure having been finished to date.

Should the concrete piles be successful, it will undoubtedly result in discarding altogether the use of wooden piles on the southern Pacific coast. Representatives of the Abbott Kinney Company have watched the course of construction carefully and it is expected the piers at Venice will eventually be supported by reinforced concrete piers.



Method of Casting Reinforced Concrete Piles

It has been noticed at Venice, where a concrete casing has been employed at the water level for reinforcing the eaten timber piles, that a white deposit has formed on the surface of the concrete. This substance is described as quite as hard as the concrete itself.

Contractor Stutzer built all the concrete bridges over the canals at Venice and reports that sea water was used in process of mixing; these bridges have stood the test of five years without showing the least disintegration. He has absolute confidence in the ability of concrete to withstand sea water if a good grade of tested cement is used and if proper mixing and handling is employed. He points to the old Spanish fort at St. Augustine, Florida, as an example; here cement and sea shells were utilized and the structure has withstood all ravages for centuries without showing the least disintegration.

* * *

Building Materials Wanted in Panama

Former Vice Consul-General Rockwood, of Bogota, writes to the bureau of manufactures from Panama calling attention to the market there for steel laths and wire netting for construction purposes, owing to the extending use of cement. He states that trade in those lines and in Portland cement could be developed to a much geater extent if quantities of the right materials were on hand, thus avoiding a delay of six to seven weeks in waiting for an order to be filled from the United States.

* * *

New Colors in Wall Papers

In wall paper the tendency seems to be away from the strong and rich reds, and popular fancy rather inclines toward greens, browns, and warm grays, or pearl tones, with the ever popular floral and cretonne papers on white or light backgrounds, the favorites for bed room decoration.

Honesty the Best Policy for both Architect and Contractor

By A. SINNER

THE ethics of the contractor is something to which the average architect and material man should, and in some measure does, pay careful attention. We have said "some" and the reason why we qualify is that it is, occasionally, to say the least, an exception.

Just why an architect does not put forward, at all times, the requirement of sterling honesty on the part of a contractor, is a question which he will have to answer for himself, but we have our ideas on the subject.

Perhaps there is something to be gained by not scrutinizing the man too closely, or being honest himself (the architect we mean), he thinks all others are, as well and in this case, he learns, when too late, that the job has been jobbed as well as others. There is another who has been hit, quite hard, and that is the owner who last of all has to bear the burden, of a "mistake" on the one part, and infamy on the other.

An honest contractor means an honest job, no heart aches, no quarrels or law suits. It means more than that. It means a good reputation for both the contractor and architect—good enough capital for either.

Give a calf enough rope and he will strangle himself. Give a crooked contractor an opportunity, and he will emigrate to pastures new, at frequent intervals.

If an architect is not a walker in the straight and narrow path, sooner or later he takes a walk also. We know of one who in "his day and generation" was a peer of them all; recently he finished a sixty-days' stunt on the county rock pile.

A contractor who "skins" the job, enjoys only a limited spell of prosperity. His song soon becomes "nothing doing."

In this bailiwick we know of contractors who need not "sign up," they make money, honestly, too.

We know of others with whom a contract as well as a bond is of little use toward completing a strictly honest job.

"Extras" are the bane of the owner;; a good architect does not have many extras. Sometimes they are necessary but as a rule, with an honest architect and an honest contractor, they are mighty scarce. True, even with the best of us, there may be something which should have been included in the original specifications and was not, nevertheless with careful drawing of the articles governing the contract there ought to be nothing wanting on which the contractor could build extra claims.

Many times we have heard of a shrewd contractor who, in making his bid, discovered some important detail which was left out, thus enabling him to make a much closer proposal than some of the less observing competitors, expecting to make up the low figure on the "extras."

We know one architect who forgot to include a stairway to a second story in the plans. The sharp contractor discovered this and made an unusually low bid, secured the job and when it came to stairways he held the owner up for a big sum and made considerable money on the contract.

Plumbers are about as questionable in these matters as any and the owner who gets out without a "hold-up" on their part is a rare one. Perhaps there is some reason why they are the most cordially hated of all the contractors, who have to do with the construction of a building.

We are not sure as to what may be the meaning of a clause included in the specifications which provides that "anything which should be included herein for the completeness of this contract and is not shall be so construed, even though it is not written."

Our best, our leading, our successful architects are those who give careful attention to every matter of detail even in the proper selection of the contractor. Those who are careless soon find thir business on the wane.

Another class of architects are those who do not progress with the times. You can tell them by noting the last building for which they drew plans and comparing it with the one planned several years since. The style is the same, the construction is the same.

Once in a while we find one who knows it all. He says: "I have used such and such material for years and it is good enough for me."

A little more reading, a little more "absorption," if you will, would do us good, but the matter of progress, on the part of all, would eliminate the factor of "has beens."

Sometimes the material man does not receive the recognition he deserves; he is in a position to do the architect a great deal of good, it is his business to keep posted on improvements and if allowed to present the merits of his goods, we are quite sure the architect would add to the character of his work without lowering his dignity.

We know of one material man who makes a specialty of a certain kind of furnishings, we will say church furniture, knows a great deal about the most modern method of construction, especially as regards seating and their arrangement. He offered one architect the benefit of a large list of such plans and received for his kindness, "No, I thank you, I do only original work, never copy anything, work it out of my head." This architect has one small back room in a cheap building, has been there several years, will be there several more, if he don't get into the County Poor House. His clothes look seedy, he looks rather rusty, is both, in fact he was a "has been" before he commenced his profession.

Another class which makes mistakes are those who always have the same contractor do their work. It looks bad, it is bad. Too close "fellowship" means loss for some one; usually, as before, the owner.

Both get careless, both get something else—sometimes. Taken however, as a whole, the profession, both of the architect, the material men, and the contractor, is far better as to its ethical side than a few years since, and it lies with the two first as to how much better it will be in the future.

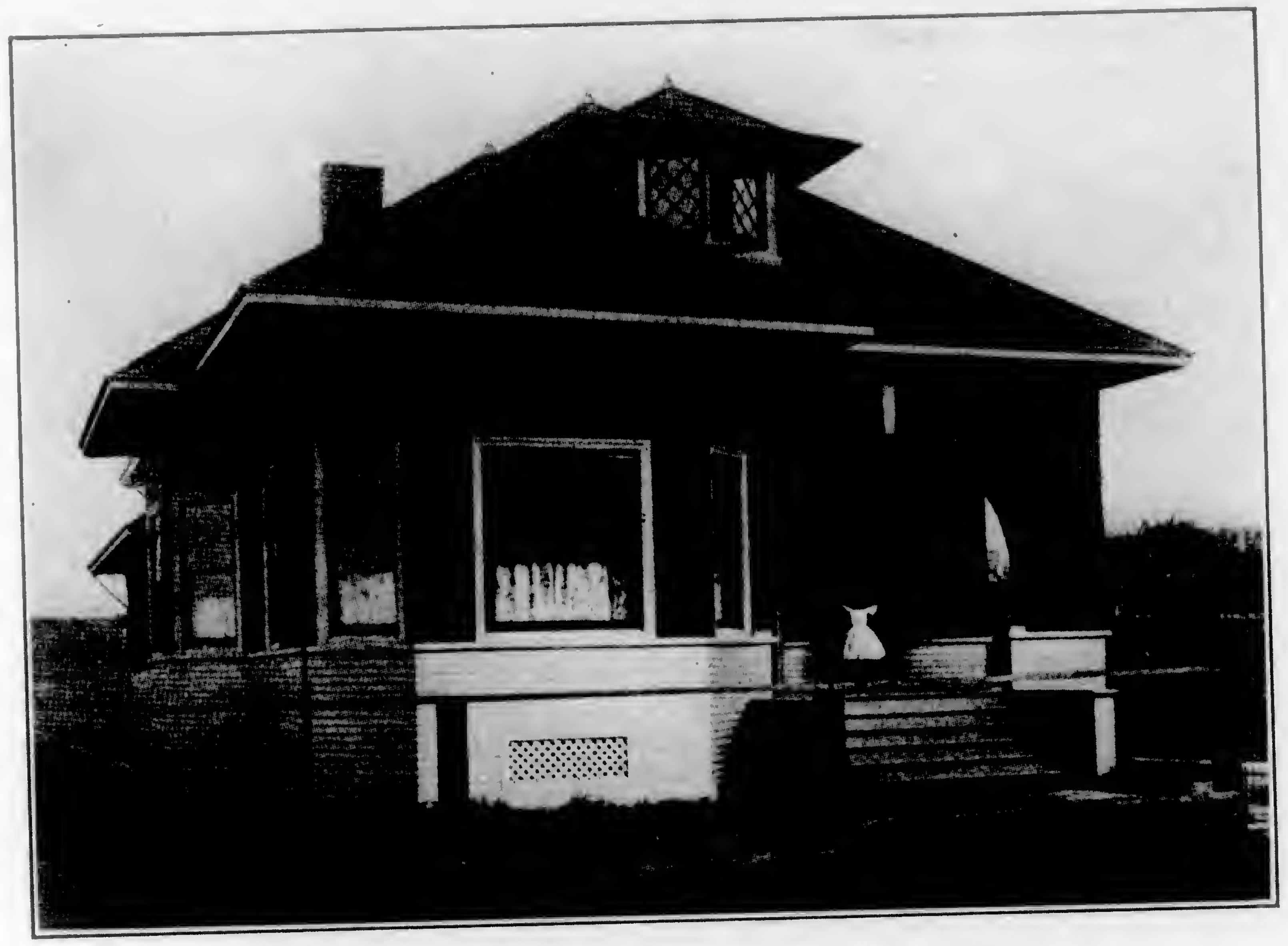
The mill, the store, the agent, next to the laborer, should have their money, all should be paid promptly, then if there is anything left, it belongs to the contractor, but to hold back money rightfully belonging to some other, is to say the least "crooked" and such should have short life.

Material should be paid for in thirty days. It is expected and nothing short of it will do.

The best paying contractors get the best prices, the architect unfortunately does not always get his from the owner, until every one else is paid—sometimes not then.

However, we are all getting good, your able magazine as well.

Portland, Ore., July 1, 1908.



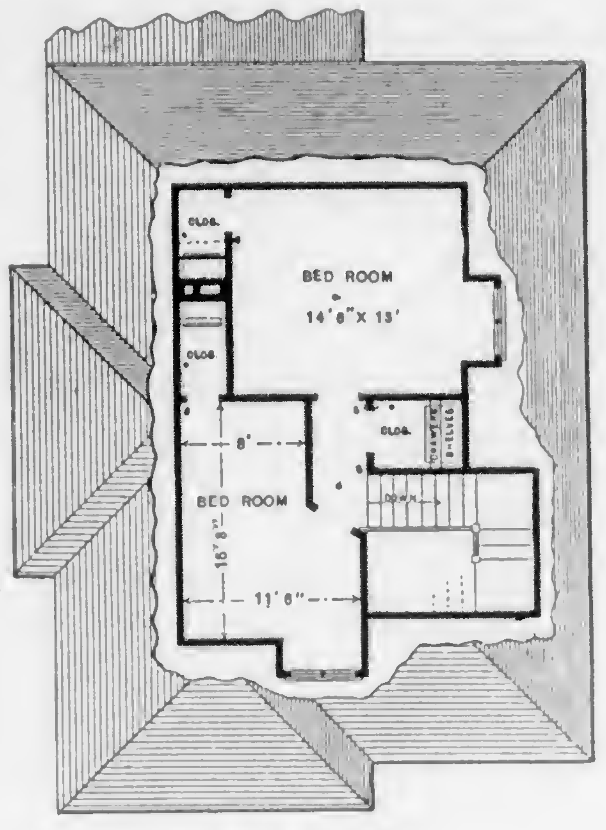
A Northern California Bungalow. W. S. Fitzell, Architect

A Northern California Bungalow

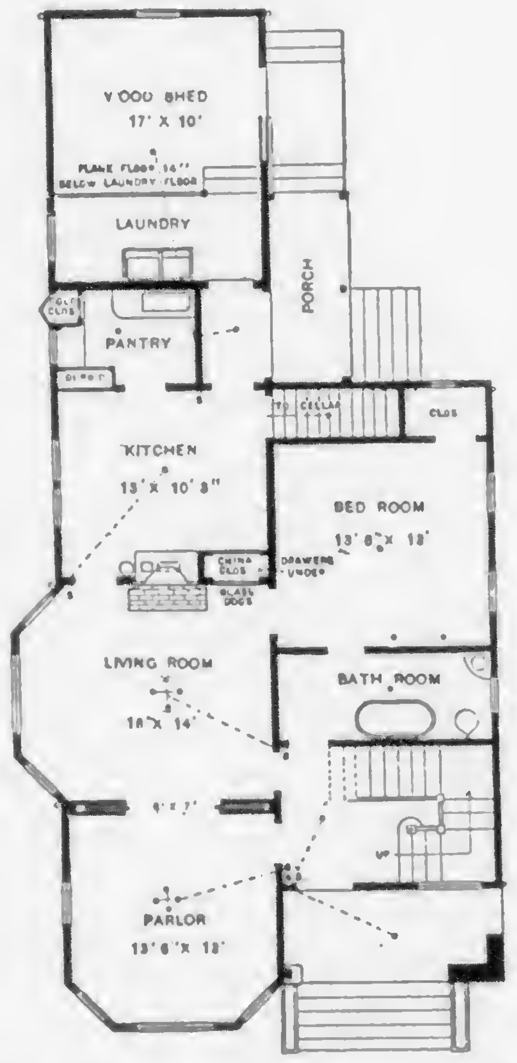
MUCH interest is being manifested in all parts of the country on the part of architects, builders and prospective house owners in that class of dwelling or cottage designated as "bungalow," and which is typical of the California climate.

According to the specifications of the bungalow illustrated herewith from Carpentry and Building, the foundation is of concrete up to the sills. The base of the chimney stack is built of concrete from the floor of the basement to a level with the kitchen floor, the center being left hollow to serve as an ash pit, which is provided at the bottom with a close fitting cast iron door to serve as a "cleanout." The walls have a footing 16 in. wide. The sills running lengthwise are 6x6 in., bedded in cement mortar, while the cross sills, bedded in the same manner, are 8x10 in., and are halved over the side sills. The joists are 2x10 in., fitted down over the sills to rest on the walls, are placed 16 in. on centers, and well bridged with 2x3 in. cross bridging. The joists are doubled under all bearing partitions, such as under the sliding doors at the fireplace and between the kitchen and pantry. All studding are 2x4 in. pine, while the ceiling joists are 2x10 in., all placed 16 in. on centers. The rafters are 2x6 in., placed 24 in. on centers.

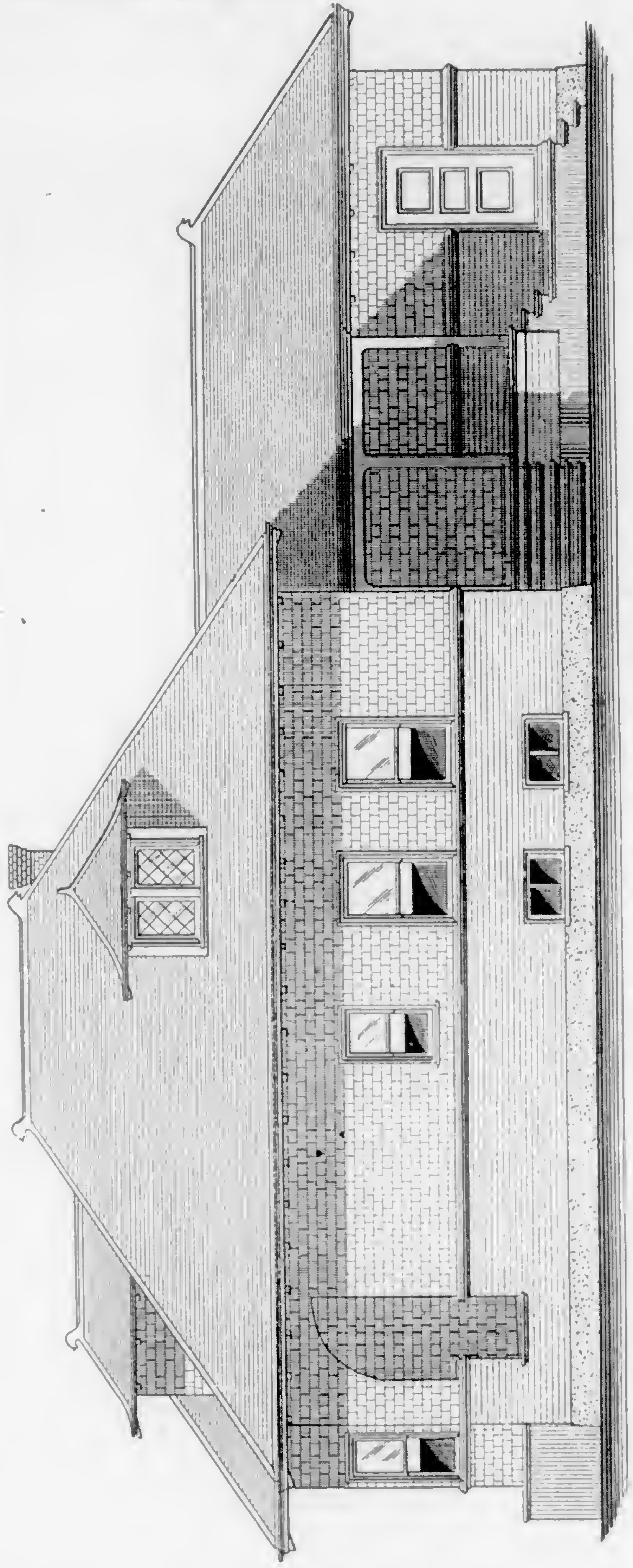
All framing timber is of pine. The outside of the building is lined with ⅞ in. surfaced lumber put on diagonally and covered with building paper. The lower portion of the house is finished with three-lap rustic extending up as high as the window sill, above which the main story is covered with shingles laid 5 in. to the weather and finished against the cornice frieze. The house has a raking cornice with exposed rafters. The gutter is formed as a box fitting in back of the 4 in. crown mold and lined with Flintcote roofing, running up under the shingles about 5 in. and fastened to the top of the crown mold with ⅞ in. half round, nailed at close intervals.



Attic and Roof Plan.



Main Floor Plan.—Scale, 1-16 In. to the Foot.



Right Side Elevation.—Scale, ⅛ In. to the Foot.

A Northern California Bungalow.—Plans and Elevation

The roof is covered with redwood shingles laid 4½ in. to the weather. The corners of the hips are covered with shingles 4 in. wide on each side of center line, and the ridge is finished with a 5 in. saddle board, covered at the top with a full round, ending in a finial at the different points as shown.

The front steps are of Oregon pine 1⅜x11½ in., with round noseing and cove under same, with risers of ⅞-in. redwood, finished at the ends with a bold buttress. The interior finish is redwood. The actual cost of the house was $2000.

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Albert Pissis to Plan Mechanics' Library Building

The trustees of the Mechanics' Institute have selected Albert Pissis as architect for its new library building to be erected on Post street, between Kearny and Montgomery, San Francisco. As is well known Mr. Pissis is the architect of the Hibernia bank, the Flood building and other monumental structures in San Francisco.

More than a month ago a building committee was appointed with power to name an architect and decide on the details of the building. Livingston Jenks was elected chairman of the committee. Meetings were held, but a determined stand was taken by two sides in favor of different firms of architects. When the trustees held their meeting the selection of an architect was left to them. A division developed in the board as in the committee, but finally Albert Pissis was recommended, and unanimously elected.

The building will be about nine stories in height and most likely will be arranged for offices, while floors will be reserved for the library and members' rooms, with stores on the ground floor. The estimated cost of the building is $300,000.

Wins Portland School Competition

Whitehouse & Honeyman, of Portland, won the competitive contest for plans for the proposed new high school in North Albina. The second prize of $500 cash was awarded to T. J. Jones, the present architect for the public schools of Portland; Kable & Kable were awarded third prize of $300, and McNaughton, Raymond & Lawrence fourth prize of $200.

Architect W. M. Summerville, of Seattle, assisted the School Board.

The plans call for a building three stories high with a full basement, built on the "H" plan and of a light type of architecture. The building will be constructed of fireproof material and will cost approximately $250,000.

As soon as preliminary details can be arranged, the School Board will award contracts and the work on the proposed structure will be started. It is the desire of all concerned to have it ready for occupancy by the opening of the fall term in 1909.

For San Quentin

The State Architects are at work on plans for the improvements ordered by the State Board of Prison Directors at San Quentin penitentiary. These improvements are to cost $350,000; this to be the cost of material alone. When the entire work is completed there will be 1600 additional cells, a new dining-hall and kitchen, wall around these, together with guard towers. The first work will include a cell house, containing 800 cells, and following these will be two buildings, in which will be 400 cells each, or 800 in both.

The California building, which is to be erected at the Alaska-Yukon Exposition, Seattle, will be built by day's labor, and not by contract.

Returns From Abroad

Architect George Alexander Wright, of the firm of Wright, Rushforth & Cahill, associated architects, has returned from a most enjoyable European trip, having been absent from San Francisco since early last winter. He visited all the principal foreign cities and spent considerable time studying the various types of English, French and Italian architecture. Mr. Wright was much benefited by the trip as when he left he was greatly in need of a rest and change of environment, having worked quite strenuously following the earthquake and fire. Mrs. Wright accompanied her husband on the trip.

Charles E. Hodges, formerly supervising architect at Stanford University, has gone abroad to remain for some time. He has a brother in England.

Landscape Architect Busy

Wilbur D. Cook, Jr., landscape architect, 616 Grant building, Los Angeles, has been commissioned to make the necessary plans for the improvement of the grounds surrounding the residence of Wm. G. Kerckhoff, in course of erection at 734 West Adams street, Los Angeles, from plans drawn by, and under the supervision of Architects Hunt, Eager & Burns.

The same architect also has on the boards drawings for the improvement of the spacious grounds of L. N. Brunswig, on West Adams street, near Arlington street. Sunken Italian gardens, terraces, winding paths and driveways and extensive lawns and flower beds are planned. The residence, which will be of stone, brick and wood, will be one of the finest in this section. The plans for this palatial home are being drawn by Architect F. X. Lourdou.

The same architect is also preparing plans for a residential subdivision of 2400 acres at Highland Park, Texas.

Architectural Exhibit

The first annual National Architectural Exposition will be held during the week of September 14th to 19th at Madison Square Garden, New York. By a combination of all departments in architecture, engineering, painting, sculpture, the trades, manufacturing and craftsmanship pertaining to the construction, equipment and decoration of buildings, as well as landscape and garden effects, this coming function is intended to be a radical departure from the usual form of exhibitions.

The Record and Guide of New York is the authority for the following statements:

Its attractiveness and importance should bring visitors, especially from the professions, the manufacturers, the trades, students, lovers of art and science in every section of the United States, and it will be of special interest to people of wealth and culture—the purchasing public. Manufacturers of the newest and best in building construction and materials, in articles of equipment and decoration, will be able conveniently and interestingly to present their products to the professions, the trade, and the public by exhibition, demonstration and application. Raw material and manufactured goods entering into the construction of buildings, engineering effects, decoration, landscape and garden features, will be shown. No space will be allotted to exhibits possessing no special features of novelty, utility, originality or beauty.

The management announces that many architects of prominence will aid and cooperate, and will exhibit in the salon, models, casts, drawings and photographs of unusual interest. This display of valuable and artistic models of edifices, the results of much thought and study by the leading architects, together with drawings and photographs of special interest, will prove of infinite educational value to the students and lovers of art and science, and to the technical and general press and laymen.

The salon will be a separate and distinct department of the exposition, occupying the high elevated promenade platform twenty feet wide, surrounding the entire arena. On this platform there will be forty studios of equal size, about 16 by 7 feet, affording three walls in each studio for hanging, and ample room in the center of each studio for models. These architects, who are the patrons of the first National Architectural Exposition, will arrange and hang their own collections.

Sculpture and paintings will be features of the exposition, and many masterpieces of art have been promised by individuals and societies, and the management is arranging with representative organizations to place in separate rooms and departments exhibits that are allied to architecture and in keeping with the plan and scope of the exposition.

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FOR HOME INDUSTRY

The Structural Steel and Ornamental Branch of the California Metal Trades Association has taken the initiative in a campaign for home industry — of interest to every public-spirited individual and civic organization in San Francisco.

To make this campaign effective the association has wisely begun with the owners and agents of property, the architects, the contractors, and all civic bodies to take up this work and cooperate to give the local plants a fairer opportunity to bid than they have had up to this time. Endorsement has been secured of the Chamber of Commerce, the Merchants' Exchange, Merchants' Association, the Manufacturers and Producers' Association, and these organizations have adopted resolutions pleading for home patronage.

It is a matter of statistical report that at the present time 75 per cent of the structural steel and ornamental iron contracts is being let out of the city to Eastern firms, which means that just that much money is going out of California.

The situation is a serious one and should not be ignored by our architects and property owners. Mr. Kerrigan's article elsewhere in this magazine is food for earnest thought.

THE PROBLEM OF ACOUSTICS

The problem of acoustics as applied to large halls or assembly rooms is being discussed quite widely just now and the facts brought out by Architect Henry F. Starbuck of Oakland in the May issue of the Architect and Engineer have been read with a deal of interest by both architects and engineers. Mr. Starbuck goes on to say that while the science of acoustics is very much in theory yet some facts have been well established, one of which is that a circular ceiling is nearly always defective, as it converges the sound waves toward a common center in such a manner as to give confused and imperfect effects.

The American Architect says there are probably very few architects who have not at some point in their professional careers, perhaps when employed with a commission which included a large hall or auditorium, searched long and diligently for some work or treatise, promising a practical yet absolute and definite solution of the problem. That these quests have been in the majority of cases unsuccessful is probably due to the fact that works presenting anything like workable formulæ, methods or even theories by which the acoustic properties of a proposed hall can be predetermined, or a hall designed which will surely possess satisfactory acoustic properties, are not so far as we are aware, of frequent occurrence in technical literature.

Of course much has been written concerning the general theory and it will be at once observed that there are certain well-known principles regarding reflected sounds or echoes which must be given consideration, and also it is recognized that the choice of materials and surfaces, even furnishings, as well as form and proportion of the room, has much to do with results.

That the problem is entirely soluble as applied to an isolated hall was demonstrated by Professor Sabine in a series of articles several years ago, but considerable inquiry among architects elicited the information that the formulæ deduced by Professor Sabine, where their existence was known, were considered unwieldy, complex, and of difficult application to the ordinary problems confronting the practitioner. It was also pointed out that the study of the problem in practice in order to be entirely effective must extend to and include the environment as well as the work in hand. Of course it is possible, if windows and openings could always be kept closed, that the hall might be studied quite independent of the surroundings, but this would be practically an impossible condition, particularly in summer.

But even if architects were able to accurately foretell the effect of neighboring buildings, rocks or trees upon the acoustic properties of a proposed hall, would they be justified in taking them into account to the extent of altering any intended or desired treatment or dimension? For might not the environment change by the demolition or addition of buildings at any time, thus rendering the provisions made ineffective?

It seems quite apparent that the entire subject will require much further study and research before it can be considered as approaching anything like an exact science susceptible of simple and ready application to the designing of auditoriums or places of assembly under the severely limiting conditions ordinarily encountered, and in the meantime failures of halls in this respect are just frequent enough to cause architects who are employed on work of this character much anxiety which at present it would seem could only be entirely relieved when the hall is completed and actual tests made.

Young Architect Drowned

Claude L. Evermann, senior member of the firm of Heide and Evermann, architects, at 604 Mission street, San Francisco, was drowned in the Sacramento river July 4th. Evermann was twenty-eight years old and he is survived by a widow and a year-and-a-half-old baby. The young man was rapidly becoming prominent in his profession in San Francisco. He was the designer of the Lowman building in Seattle and of several of the exposition buildings at St. Louis and Portland.

Municipal Building

City Architect N. J. Tharp of San Francisco, is making preliminary plans for the new city and county Hospital. The plans under consideration call for a seven or eight-story fire-proof structure with sudsidiary buildings for tubercular and infectious diseases. There is a possibility that competitive plans from outside architects may be invited, in which case the preliminary plans will served as a basis for all work. The City Architect is also at work on plans for a dozen new school houses.

LIGHTING AND HEATING

As Applied to Buildings

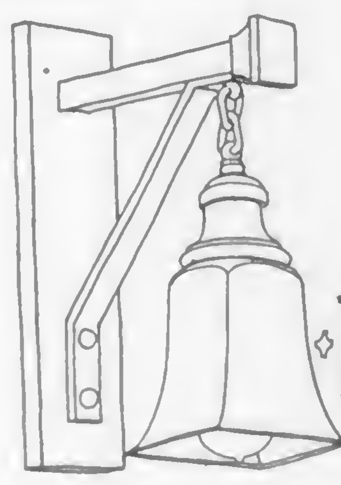
Now You Can Buy Gas in a Bottle

BLAUGAS, a compressed illuminant which can be taken home in steel bottles and fed into the burners by means of little copper tubes no larger around than ordinary wires, was lately introduced to the Society of Chemical Industry by Prof. William Hallock. He is the dean of the department of physics in Columbia University and has given much attention to illuminating methods.

This new kind of lighting vapor resembles in composition ordinary gas such as the people of New York now use. It was invented by Herman Blau, of Augsburg, Germany. It is made at a somewhat lower temperature than is needed in the retorts in this country, and the product is compressed until it takes liquid form. The turning on of the stopcock of the cylinder in which it is placed causes the fluid to expand into gas, and out it comes like the genie which the gentleman of the Arabian Nights' tale found in the bottle he took from the sea.

It burns with a bright light which compares favorably with electricity in brilliance. Professor Hallock declared, however, that it was more expensive than the ordinary gas of the street mains, which he said was good enough in its way, but "horribly inefficient."

Blaugas is not likely to drive out the gas companies of New York, and the chief chemist of the Consolidated Gas Company sat on a table at the back of the hall and chuckled. Blaugas, however, is a very portable commodity, and it can be taken aboard yachts and "wired" in country houses, and made available very easily on short notice.



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Professor Hallock said that it was not affected by temperature changes and could be kept indefinitely.

"In fact," he said, "I do not see any reason why Blaugas could not be willed in cylinders from father to son for generations if it should be necessary to keep it in the family as an heirloom for so long."

He installed several cylinders filled with the new illuminant in the lecture room of the Chemists' Club and turned on a few litres of it for the benefit of the scientists. The tubes which he employed were of finely drawn copper and were only one-sixteenth of an inch in diameter. They were curled about just like electric wires, and at a distance they looked just as though they might be part of some electric machine.

Professor Hallock declared that a ten kilo cylinder of Blaugas, which costs $1.50, would supply a 50 c. p. incandescent burner for four months, provided it was used four hours a day.—New York Herald.

Home-Made Lighting Plant

In his leisure hours Fred Brendel, engineer of the Commercial building, at St. Louis, Mo., has been constructing and just brought to completion an electric lighting plant which he has installed in the yard back of his residence on Union boulevard.

With his home-made electric lighting plant he is able to illuminate his home and that of a tenant and furnish enough power to run a sewing machine and other small household machines, do the family ironing, run electric fans and proposes in the near future to be able to cook.

In the house is a four-horse power engine and generator. The engine is run by gasoline and is managed by Mrs. Brendel, who has been appointed chief engineer, while Mrs. Louis Daniels, who occupies the upper part of his residence, is assistant engineer.

The plant cost about $400 to construct and the cost of lighting the house is about ten cents a night.

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Heating and Ventilating A Modern Theater

By William E. L. Leland, C. E.

THE first theatre to be erected in the down-town district of San Francisco since the fire is the Orpheum, now under course of construction on its old site on O'Farrell street.

The building is of the Class "A" type with steel frame and concrete floors and walls, and will be as fireproof as modern invention can make it. The owners desiring to make the appointments of this theatre unexcelled by any, have provided it with an up-to-date heating and ventilating plant, a short description of which is given herewith.

The theatre is arranged with main floor, balcony, gallery, and three tiers of boxes and will seat about 2500 persons. The ventilating apparatus is designed to furnish an aggregate of 52,000 cubic feet of fresh tempered air per minute, which is equivalent to about 21 cubic feet per minute for each occupant of the house. Exhaust ventilation to the amount of 42,500 cubic feet per minute has been provided, and this being slightly less than the fresh air supply, the house will be operated on a pressure, thus causing any leakage to be outward rather than inward.

The fresh air for the warming and ventilating of the theatre is taken into the building through two large gratings in the exit passage at each side of the house about on the sidewalk level, and is then drawn through two air washing devices for the removal of dust and dirt, and then passed through a system of heating stacks where it is warmed to the proper temperature before being discharged into the plenum chambers. The entire space under the auditorium, and likewise under the balcony, has been tightly constructed, forming the two main plenum chambers from which the air is admitted to the auditorium through perforated openings in each chair leg, through floor register openings in the boxes, and through screens in the front of the chair risers in the balcony.

The foul air and smoke are removed from the pockets under the balcony and gallery, and from the ceiling above the back part of the gallery, and from the dome in the center of the main ceiling. Air is also removed from the boxes and the dressing rooms back of the stage, and the toilets, etc., under the stage.

The steam for supplying the required heat for the building is generated in a large sectional cast-iron boiler under the area at one side of the stage, and is conveyed to the two heating stacks and the direct radiators by a simple gravity system of steam piping, the returns being taken back to the boiler in piping run along the floor, and below the water line. Each section of the heating stack is provided with valves for shutting off the heat when desired.

A special system of automatic heat regulation will be provided for the control of the temperature in the auditorium, and thereby the overheating of the theatre will be prevented automatically. Three thermostats will be provided and installed at different points, and connected with the valves in the steam pipes to the heating stacks in such a manner that the separate sections of the heating stacks will be automatically shut off in rotation as the temperature of the auditorium approaches the required point of about 65 degrees. This automatic control of the temperature will result in the saving of fuel for the owners, and will also assure the patrons of a comfortable house free from the usual objection of overheating.

The apparatus designed for the handling of the fresh air supply consists of two three-quarter housed steel plate ventilating fans of the American Blower Company's manufacture, with blast wheels 7 feet in diameter. The fans are located under the rear of the auditorium at each side of the house and are arranged to be driven by two direct connected electric motors wound for 220 volts direct current. Each motor is provided with a compound starting and speed regulating rheostat, arranged for the operation of the fans between the limits of 120 and 180 revolutions per minute.

In front of the fan inlets are placed the heating stacks, each consisting of two groups of pipe coils arranged in two groups deep with a total depth of eight rows of one-inch pipe. These heating coils are set as high as possible so as to obtain the gravity return of the condensation to the boiler, and beneath the coils is arranged a by-pass damper for the control of a portion of the air which may be passed under the heating stack without passing through it. The stacks are of sufficient capacity to heat the total volume of air passing through them from 40 to 90 degrees Fahrenheit.

Between each heating coil and its fresh-air inlet is placed a coke air washer, consisting of two galvanized iron screens set about nine inches apart, the space between the two screens being filled with coke broken to small size. A water pipe is arranged above the air washer and perforated in such a way that a spray of water can be run over the coke continuously or intermittently as desired. The air in passing through this wet coke will become cleaned of all dust and foreign particles, and to a certain extent cooled. Doors at the top and bottom of the screen are arranged so the coke can be removed and replaced by fresh material whenever it may become necessary.

From the outlet of each fresh-air fan two galvanized iron connections are made, one opening into the main plenum space under the auditorium floor, and the other leading up to the space under the balcony, which forms the smaller and secondary plenum chamber, and from which the air is admitted through screens in the front of the chair risers to the main body of the house.

A system of air tight exhaust ducts in this plenum space connects six screens in the ceiling of the seating space under the balcony, with two exhaust shafts passing up on the outside of the building, to the exhaust fan houses. The space under the gallery constitutes an exhaust chamber, into which foul air and smoke from the balcony pass through seven screens and

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thence through openings in the side wall of the house to the main exhaust shafts mentioned above. Foul air is also taken from the ceiling above the gallery, and from an exhaust space around the central dome through a system of exhaust ducts to the fan chambers located above the main stair wells on each side of the building. From these fan houses forty-eight-inch direct-connected motor driven disc fans discharge the foul air to the atmosphere through large louvred openings in the sides of same. Exhaust ducts leading from the boxes, also connect with these exhaust fan systems. A forty-five-inch steel plate exhaust fan is located in the basement at one side of the house, and is operated by a direct-connected motor. This fan handles the air from the ladies' dressing room, toilets, and bar, and also from the animal room in the basement, through a system of galvanized iron ducts, and discharges its foul air through a vertical shaft passing up through one of the exit areas at the side of the building. This fan is capable of handling 2500 cubic feet of air per minute at a speed of 635 revolutions.

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A small amount of fresh air is admitted to the stage through two floor registers placed at each side near the rear wall, and this air passes out through the dressing rooms to the forty-five-inch exhaust fan described above.

The heating of the stage is accomplished by direct radiation, one radiator of eighty square feet capacity being placed on each side of the stage near the fresh air inlets.

Each dressing room is provided with a radiator of five square feet of the colonial wall pattern. All the radiators are provided with hand control valves and are under the immediate control of the stage hands and the occupants of the several rooms.

The building was designed by Lansburgh & Joseph, architects, and the heating and ventilating apparatus is being installed by Messrs. Abrahamson & DeGear under the direction of the writer, who designed this part of the work.

Brick vs. Concrete

By L. O. Ives, Portland, Ore.

A BRICK enthusiast writes in a Portland paper as follows:

That brick is not destined to be replaced by concrete in the construction of permanent buildings is more than evidenced by the most superficial observation. If prospective builders will but observe they will quickly find in every community the proof of the statements of this building expert, T. B. Gridley, who says in a recent edition of the Bricklayer and Mason, the following: "Have you thought of what kind of concrete work is on the increase, or who furnishes the material? It is municipal work, as a rule, fostered by politicians, so that they may sell the material while some 'friend' performs the work at the right profit. The greatest example of this advocacy of concrete is the new Barge Canal of New York state. The work is being accomplished by foreigners and machinery. The masonry work is all concrete, furnished and built by political construction companies. The citizen mason or laborer does not appear on the scene, nor does he derive any benefit from this $101,000,000 project." Brick, in addition to having been proven the best building material for all conditions of time and weather, not excepting stone and granite, is universally a home product. Buildings of brick are home-made from the clay to the shingles.

In the face of this array of facts, it is altogether improbable that builders with sagacity enough to conserve their own interests, will choose a material which, in addition to being inferior in quality, must also be imported from a foreign country."

It is not the intention of the writer to condemn or belittle the brick industry or

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the men who are engaged in it, but the writer does believe in a "square deal" and a truthful presentation of facts to support any argument he may present, does believe in progress and improvement, does not believe in letting out a bitter howl of mortification and dismay if his toes do happen to get stepped on, for he knows full well that if he keeps moving forward with the procession this latter condition will not obtain and consequently his toes will be more safe than he who stands still and "yawps."

According to the above quoted article, the cement product of this country is owned and controlled by the "politicians" and the only reason that concrete (composed of cement, sand and gravel) is used is because "politics" dictates its use so that the "politician" can sell it and his "friend" work it up and "on" the poor deluded public, the individual, what a senseless, spineless lot of people there are in this country!

The man who has been fortunate enough to accumulate a snug sum of money and who believes in the upbuilding of his city, as well as creating a future income for himself or his family, according to this "brick" advocate, does not investigate, but blindly rushes in, at the behest of the "politician" and his "friend" and against the interests of the "citizen laborer and mason" and invests his millions of dollars in structures that are in hourly danger of collapse! This, too, in spite of the fact that the "brick trust" is credited with being "some pumpkins" when it comes to the game of politics!

Now for a few bald facts regarding cement. From the days of the first Mayflower settlements in this country to the beginning of the nineteenth century, quick lime formed the basis of the plasters and mortars, and neither brick nor stone can be used without the help of cementing materials of some description. This is a fact that any fair-minded man must admit, such being the fact, and the bonding material being of equally as imperishable nature, equally, so far as tensile, compressive and transverse strength is concerned, why, may I ask the reader, is not the bonding material built in monolithic form or in the form of bricks or blocks equally as good or better than the brick or stone? Especially as the most mendacious of the "brick" journals and users admit that it gets harder and improves with age. Besides, dear Mr. "Brick" Man, city ordinances compel the use of cement plaster on the inside of "brick" chimneys! Why!

During the construction of the Erie Canal, mentioned in Mr. "Brick" Man's article, through the State of New York, from about 1820 to 1825 (some years antedating the wicked "politician's" control of this country), the first American hydraulic cement, a natural rock cement, was made for use in that work. The production was about 25,000 barrels per year, which gradually increased to 7,000,000 barrels a year by 1890.

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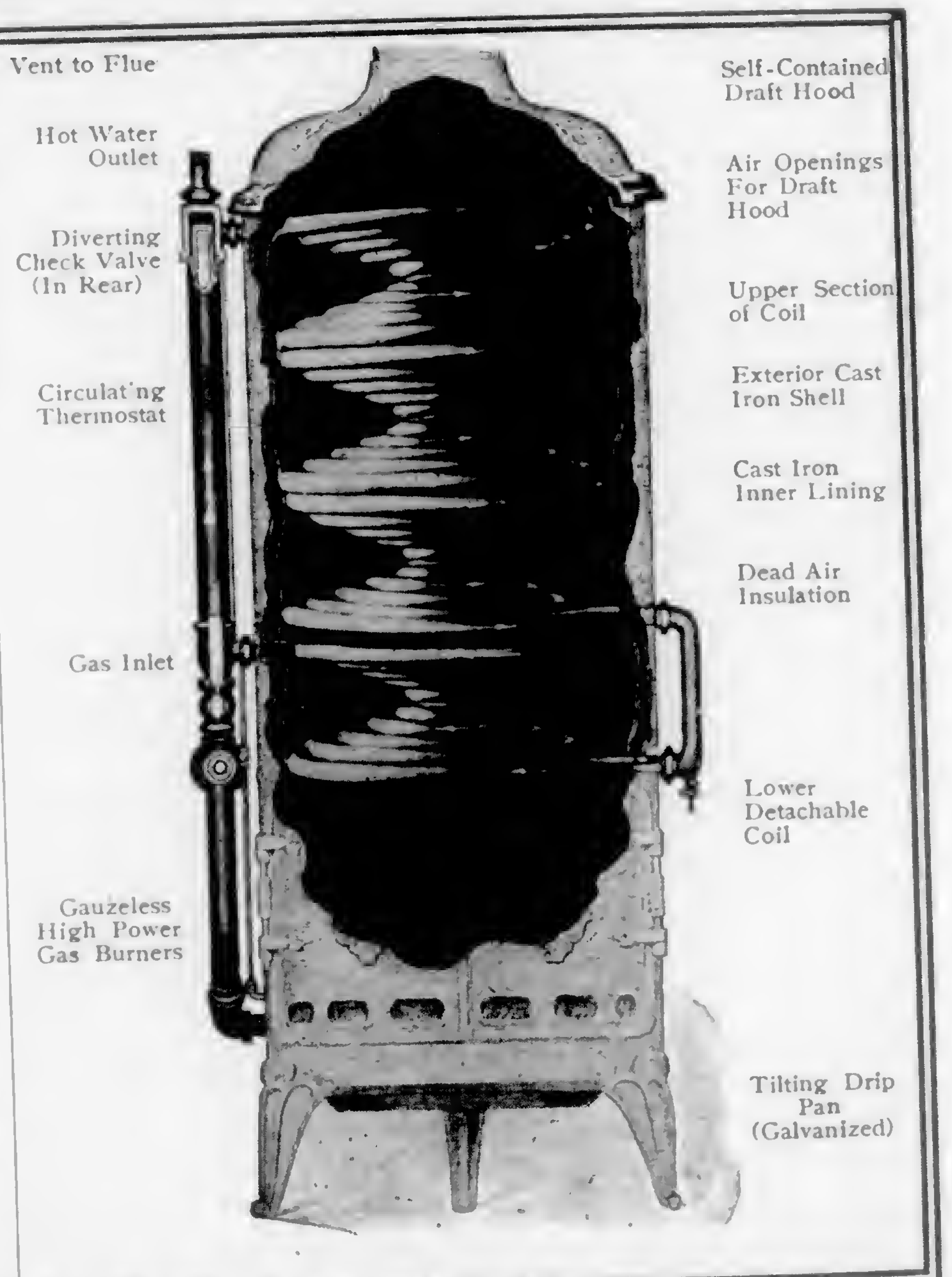

In the early 70s the manufacture of artificial Portland cement was begun in this country, and by the year 1900 had equalled the output of natural cement, each being about 8,000,000 barrels. Since that time the progress in manufacture and use of Portland cement has been phenomenal, there being produced last year about 50,000,000 barrels.

We imported of foreign cements during 1907 a total of 2,000,000 barrels and at the same time exported 1,000,0000 barrels of our domestic Portland cement. We are now consuming in the United States 170,000 barrels every day and that amount is increasing very rapidly. Why? Because, as the "brick" journals put it, people who have the money to build such magnificent structures as the Auditorium, Lankershim, Hamburger store, Citizens' Security Company Bank, Citizens' National Bank, and San Firanda building in Los Angeles; the Grand and Plaza Hotels at San Diego; the Spaulding at Long Beach, Cal.; the Phoenix at Phoenix, Arizona; the quaint depots of the Santa Fe system; the Couch, Burkhart and Board of Trade buildings here in our own Rose City, are owned and controlled by the "politicians" and have no chance to use their own brains and judgment.

The writer wants to state that the concrete industry is only in its infancy, that improvements are constantly being made in its manufacture, that those engaged in its use are constantly learning the best methods of its use, that none of us know all about it, but we are willing to learn and are averse to standing still and moaning because some few in our ranks are either too ignorant or too dishonest to do their work right and have an occasional failure. We also wish to state that as many collapses of "brick" buildings have occurred as in "concrete" and from identically the same causes—imperfect material or workmanship. Further comment is needless. Concrete construction has obtained for thousands of years, and the elements have had no other effect on it than to make it harder as it grows older. Fire tests as applied by experts in the U. S. government employ show that concrete only peeled off to some extent, while brick under the same test cracked. Which, Mr. Reader, would you consider the safest, a cracked wall, or a slightly peeled wall? Our greatest architects seem to recognize the value of concrete as a fire resisting material, when they specify its use as fireproofing for roofs, floors, beams, columns, etc., in all steel buildings wherever erected.

Concrete as bridge material has made an awful inroad on steel construction. On every hand and in every city of consequence in this country and in Europe, bridges and viaducts of concrete are appearing instead of the wooden or iron and steel structures of the past.

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By the Way

Some Industrial Information Worth the While

High Pressure Oil Burners

The S. T. Johnson Company has recently installed one of its high pressure oil-burning machines in the basement of the Pacific building, San Francisco. This company has established an excellent business in oil-burning plants for not only steam boilers but baking ovens, melting and forging furnaces, pumping systems, etc. The S. T. Johnson Company manufactures its own burners at 1334 Mission street, San Francisco.

Associated Oil Company Moves

The Associated Oil Company is now located in commodious and handsomely fitted up offices on the seventh floor of the Wells-Fargo building at Second and Mission streets, San Francisco. Since the fire the company executive offices were in the Kohl building.

New Metallic Lath

The Bostwick Steel Lath Company of Niles, Ohio, has just perfected and placed upon the market a new Metallic Lath to be known as the "Truss-Loop."

As the name signifies, this new style has a loop, which, being given an extra operation receives so much added strength that it cannot be crushed down from ordinary causes.

The material also has all the favorably considered features of the "Old Reliable" Bostwick Steel Lath which is still being manufactured.

Both the latter and "Truss-Loop" are economical as to plaster, making them, even at higher first cost, preferable to expanded metal.

The "Truss-Loop" is just a little stiffer and better than any sheet metal lath sold in this country.

Pitcher Door Hanger

The Pacific Tank Company, manufacturers of the well-known Pitcher sliding-door hanger, has recently moved its executive offices to 318 Market street, San Francisco. They have been handsomely fitted up, the millwork being turned out at the company's factory. The wood trim is a beautiful grain of fir. Manager Pitcher reports a constantly increasing demand for the door hanger, orders coming from architects all over the coast.

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Contracts for Heating and Ventilating

Recent work taken by the Machinery and Electrical Company of Los Angeles includes heating and ventilating contracts for the following buildings: Thirty-seventh street school house for the city of Los Angeles, 19 rooms and costing $55,000; school building at East Vernon for the city of Los Angeles, schools at Eagle Rock, Edendale, Belvedere, Lincoln Park, South Pasadena, Uplands High School at Mesa, Arizona, a $6,000 plant in the new Elks building, Los Angeles, the San Pedro street school, Los Angeles and the Florence Heights school, San Diego.

To the Machinery and Electrical Company belongs the credit of installing in the Hamburger Department store, Los Angeles, the largest and most complete system of heating and ventilating that has ever been placed in a department store building west of New York. It is a modification of the well known Sturtevent Pressure Plenum System and in putting it in position many difficult problems in engineering had to be overcome. These will be described in a later number of the Architect and Engineer and will, no doubt, prove exceptionally interesting to the profession.

As previously announced the Machinery and Electrical Company received contracts for heating and ventilating all the new San Jose school houses and Manager Noble reports that the installation work is practically finished and will be in readiness for the opening of the fall term in September.

Adds Show Room to His Store

Clark Steger, the Fresno electrician, has made some changes to his Fresno store, having fitted up an attractive display room for lighting fixtures. He has added to his stock and now carries one of the most complete lines of gas and electric fixtures of any firm in Fresno county. A recent contract filled by Mr. Steger and of which he is quite proud is the installation of an electric light plant at the Renaud ranch. The plant includes a generator, storage batteries, etc., and has a capacity of 40 lights. The wiring of the Court house and streets of Fresno for the Fourth of July was done by the Steger Company. There were just eleven hundred lights.

Wallace-Lindesmith Hoist Company

The Wallace-Lindesmith Hoist Company of Los Angeles whose hoists, concrete mixers, etc. are sold all over the country, has recently been re-organized and H. F. Johnston of Pittsburg, Pa., succeeds S. T. Wallace as California manager with headquarters in Los Angeles. Mr. Wallace has retired from the company. The other officers are B. C. Turbery, president, and F. E. Porter, vice-president, both of Los Angeles. The company's main office is now at Fort Wayne, Indiana, where a large plant has been established with excellent shipping facilities. The plant at Los Angeles will, of course, be retained and will supply the Pacific Coast trade as formerly.

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Ornamental Iron and Bronze

The Golden Gate Structural and Ornamental Iron Works of 107 Eleventh street, San Francisco, are now equipped to turn out first class work in ornamental iron for elevator cabs and elevator enclosures as well as cast and wrought iron stairs, The company also carries a large stock of bronze moulding. All the ornamental iron work in the Alcazar Theatre, San Francisco, and in the new building of the Stockton Savings & Loan Society of Stockton, Cal., was furnished by the Golden Gate company. Meyers & Ward were the architects of the Stockton Bank building.

This Lath Does Not Rust

For a lath that is absolutely rust proof Southern California architects have found the Mahoney galvanized iron lath handled by the Union Lime Company about as good as any on the market. Some of the architects in Los Angeles specify this lath exclusively. It has been found especially practicable for Mission style houses. The Union Lime Company has been busy since the first of January, due largely to the excellent management of the company.

Hardwood Firm Expands

The Browne-King Company, with offices in the Bacon building, Oakland, are now located in Warehouse No. 5 on First street, between Washington and Clay streets, Oakland, having found it necessary to secure larger quarters for a constantly growing business. The company's offices are consolidated in the same building as the warehouse. Recent contracts taken include the maple flooring for the new White House in San Francisco; the Building Trades Temple, San Francisco; the Lincoln, Washington and Prescott school houses, Oakland, and the Agnew State Hospital buildings. The company handles the Century brand of oak flooring, besides a full line of hardwood lumber.

Imitation Stone Contractor

O. Barbi, manufacturer of all kinds of imitation stone, including sills, lintels, columns, pilaster caps, etc., with studio at 528 Hyde street, San Francisco, has lately arrived from New York, where he was in business for five years, during which time he erected several fine residences and flat buildings. His composition is a new one, his own invention, and is guaranteed to be absolutely fire and waterproof.

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Carnegie Plant Busy

M. A. Murphy, manager of the Carnegie Brick and Pottery Company, recently returned from an Eastern trip. The company's manufacturing plant at Tesla, San Joaquin County, is operating with a good force of employes. The glaze brick made at Tesla is in good demand, and orders on the books for 150,000 are yet to be filled. There is only a moderate demand for ordinary face brick. A number of small jobs are on hand but no large contracts have been taken recently for this material. A few contracts for architectural terra cotta are being filled. The Carnegie Brick and Pottery Company is supplying the terra cotta for the new Italian Bank building, which is being erected of reinforced concrete on the gore lot at the intersection of New Montgomery avenue and Washington street, San Francisco. The exterior facing and ornamentation will be of terra cotta.

Do Splendid Mill Work

The Enterprise Planing Mills of Stockton are reaching for out-of-town business and the company is prepared to figure on work as far north as Portland and as far east as Reno. Bank and office fixtures, bar fixtures, show cases and grille work are among the mill's specialties, a large draughting force and corps of expert mechanics being employed to insure first class work. The Enterprise Company maintains one of the largest and best equipped planing mills on the Coast and is in position to not only do good work but to handle all orders with dispatch. Designs and estimates will be furnished without cost.

The company has in its employ an up-to-date cottage designer whose services are at the disposal of the Mill's clients at no expense whatever to the prospective builder. The company will provide preliminary drawings and should it be successful in receiving the contract for the mill and cabinet work, no charge whatever is made for the architectural work, but in case some other bidder is given the work then a charge of two and one-half per cent of the cost of the building is made.

R. P. Morrell is the moving spirit in the Enterprise Mill and to his untiring labors is attributed much of the success of this wide awake and progressive Stockton concern. The offices and mills are at 208-216 East Lafayette street, Stockton, Cal.

Motors for Sale

The Enterprise Electric Company of San Francisco has received a large shipment of second-hand motors which are being offered for sale or rent at very reasonable prices. The motors run from fifty horsepower down.

The Baxter Marble Company

The Baxter Marble Company is the name of a new concern that has lately entered the marble field in San Francisco and vicinity and it bids fair to meet with a successful career. Mr. Baxter is a hustler and he appears to have an excellent grade of marble. The stone is as sound as it is fancy and has been pronounced by experts superior to the more expensive imported stock. It is on the same order as the pavonozzo marble and is the first of the kind to be produced in the United States. The quarries are in California and the executive offices are on the tenth floor of the Call building, San Francisco. The company recently completed the marble work in the new Bellevue hotel and it is an exceptionally fine piece of work.

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Stockton Brick Company

The Stockton Fire and Enameled Brick Company is getting excellent results at its new plant at Stockton, Cal. James Hyslop, who was formerly connected with the Carnegie Brick and Pottery Company, has charge of the clay mixing at this plant. Two additional Hoffman kilns are being installed, with a capacity of 1,000,000 per month. The fire brick which has been turned out recently has given great satisfaction. It has a quartz fronting, which prevents the brick from shrinking when it cools after being exposed to heat. It is said that the Santa Fe Railroad Company, which has been using some of this fire brick for lining locomotive fire boxes, has gotten 100 per cent better results than with any other brick.

Competitions

The Board of School Inspectors of St. Paul, Minn., proposes to erect four new High School buildings. Plans for the first, the New Mechanic Arts High School, will be selected by means of an open competition. For information and schedule of requirements, address S. L. Heeter, Superintendent.

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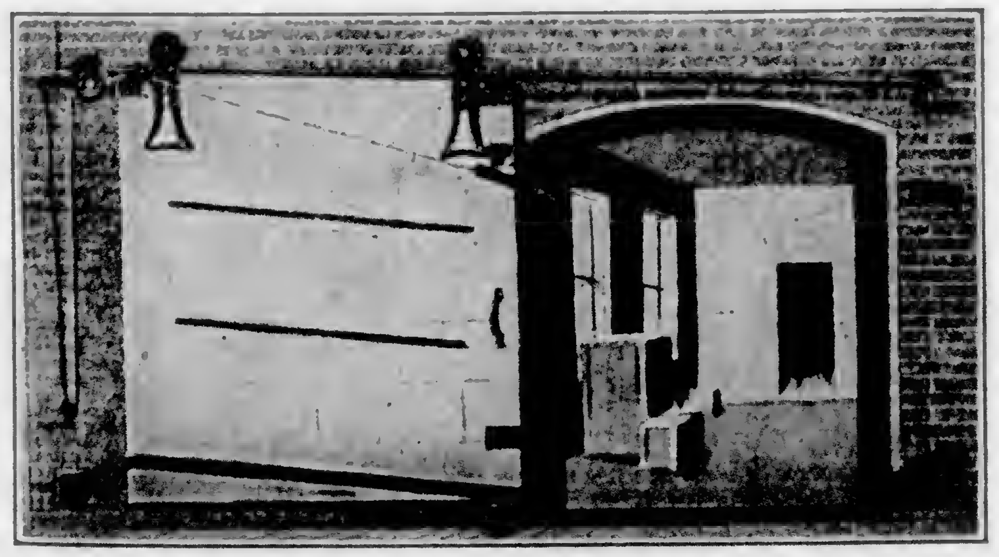

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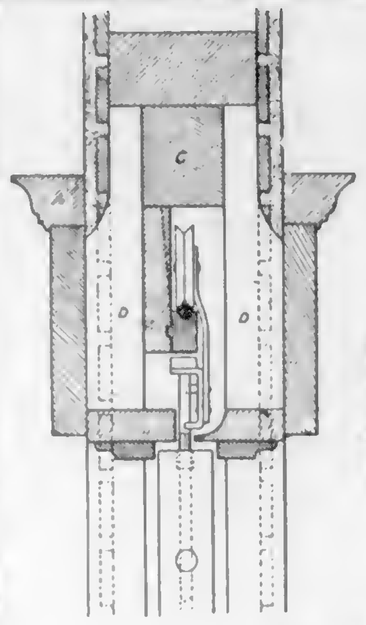

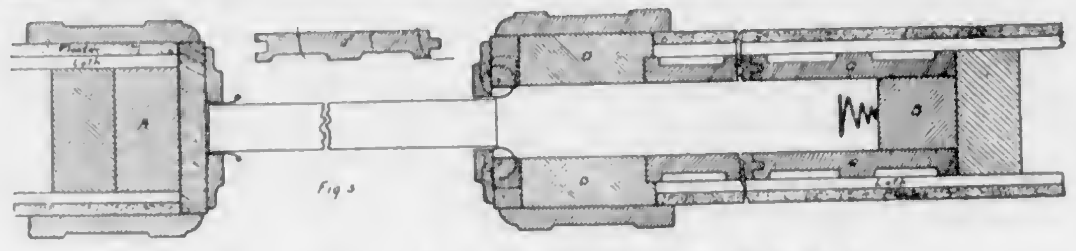

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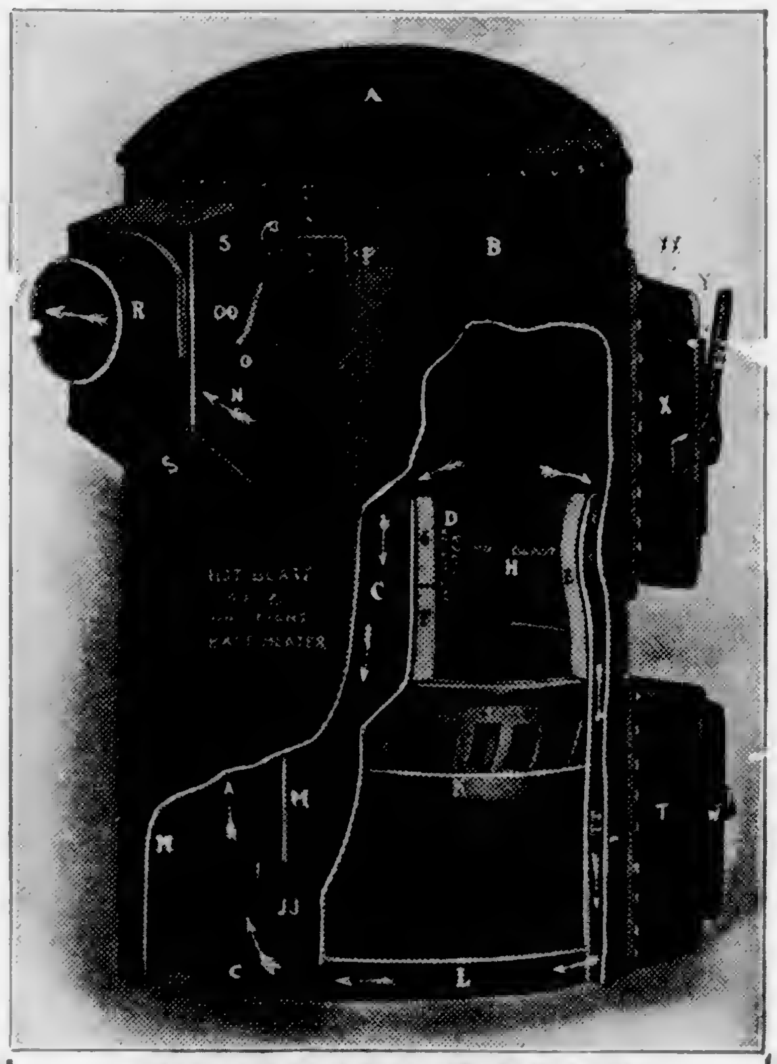

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Cement Bids

Bids for furnishing the Isthmian Canal Commission with 4,500,000 barrels of Portland cement were opened in Washington on June 1. Twenty-five firms submitted bids, five of which offered to supply the entire quantity.

The Santa Cruz Portland Cement Co., Crocker building, San Francisco, offered to supply the entire quantity, in bags, delivery Oakland, Cal., at $1.3875 per bbl.; for 2,500,000 bbls., delivery in bags at Oakland, $1.3875; for 1,500,000 bbls., in bags, at Oakland, $1.3875; allowance for bags, 5c. each.

Pacific Portland Cement Co., Market and Fourth streets, San Francisco, offered 750,000 f. o. b. South Vallejo docks, or Port Costa, Cal., in barrels, $1.70; in bags, $1.62; or in bags, packages to be furnished by the Canal Commission, $1.14; for 850,000 bbls., La Boca delivery, foreign ships, $2.40 per bbl.; in bags, $2.32, or in bags furnished by the government, $1.84; allowance for bags, 6c.; barrels, 30c.

California Cement Rejected

A dispatch from Washington states that Secretary Taft had a conference with Colonel Hodges of the Isthmian Canal Commission, Gen. E. Edwards and W. Freeman of Milton, Cal., respecting the cement bids recently opened. The government expects to use 4,500,000 barrels of Portland cement in the construction of the canal. Mr. Freeman urged that the Californians be given at least a part of the contract, but it was decided that the California bids could not be accepted because of a difference of about 26 cents a ton. Secretary Taft expressed his regret that he was unable to award a part of the contract at least to California.

Branch of the A. I. E. E.

A branch of the American Institute of Electrical Engineers has been organized in Los Angeles. Sixty-eight members of the profession were in attendance and took part in the proceedings. The Los Angeles branch will take in the whole of Southern California, making it one of the largest sections of the Institute. C. W. Koiner, general manager of the municipal lighting plant at Pasadena, is chairman and J. E. MacDonald, 444 Pacific Electric Building, is secretary.

Electrical Contractors Choose Officers

The San Francisco branch of the National Electrical Contractors' Association met in San Francisco on June 10th and elected the following officers: President, R. W. Martland; vice-president, Paul C. Butte; treasurer, Charles E. Wiggins; secretary, F. W. Myers.

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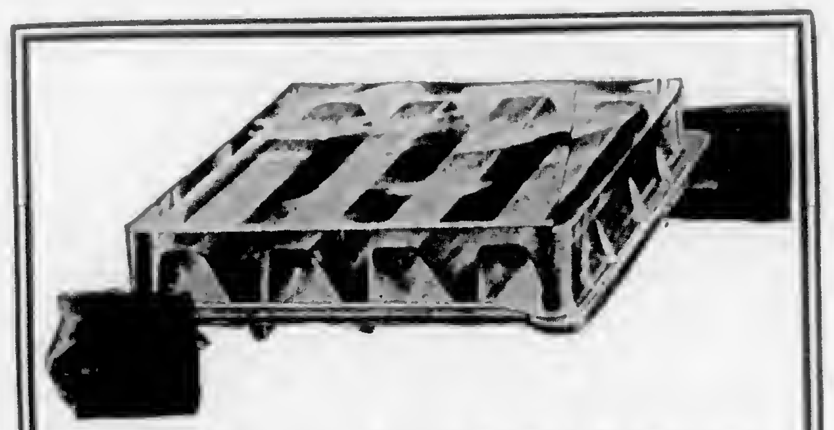
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Building New Factory

During these days of business depression, bread lines, idle factories, etc., a cheering note comes from Youngstown, Ohio, where a large additional factory building, 60x200 feet, will be erected at once by The General Fireproofing Company. This building will be put to a novel use, and is an evidence of the progress being made in finding a substitute for timber, which is so rapidly disappearing. It will be devoted to the manufacture of steel office furniture and filing devices, including steel sections or "units," desks and tables.

This furniture is finished to so closely resemble oak or mahogany that the difference cannot be detected by sight alone. The steel furniture possesses advantages over wood, in that it is fire-resisting, space-saving, indestructible through use, and is not affected by moisture, which frequently plays havoc with wood furniture, causing the veneered finish to blister, and drawers to swell and stick in the cases. Messrs. Lilley & Thurston are the San Francisco representatives of the General Fireproofing Company.

Los Angeles Pressed Brick Company Busy

The Los Angeles Pressed Brick Company is supplying the terra cotta fireproofing to be used in the construction of the new buildings for the State Hospital at Agnews, near San Jose. It will take several thousand tons to complete the order. They are also shipping fireproofing material to the Taft & Pennoyer building at Oakland which is being erected from plans and under the supervision of Architects Parkinson & Bergstrom. They are also supplying the terra cotta fireproofing for the Phelan and White House buildings at San Francisco.

Steiger Terra Cotta Works Down Town Again

The Steiger Terra Cotta and Pottery Works, W. E. Dennison, president, is again back in the Mills building, San Francisco, having recently vacated temporary offices at Eighteenth and Division streets occupied since the big fire. It is pleasant to note the return of such companies as the Steiger to the reconstructed business district of San Francisco. The Steiger Company has been very successful since the fire and has kept its great plant in South San Francisco running full blast without a lull, The city yard will be continued at Eighteenth and Division streets, between Folsom and Harrison.

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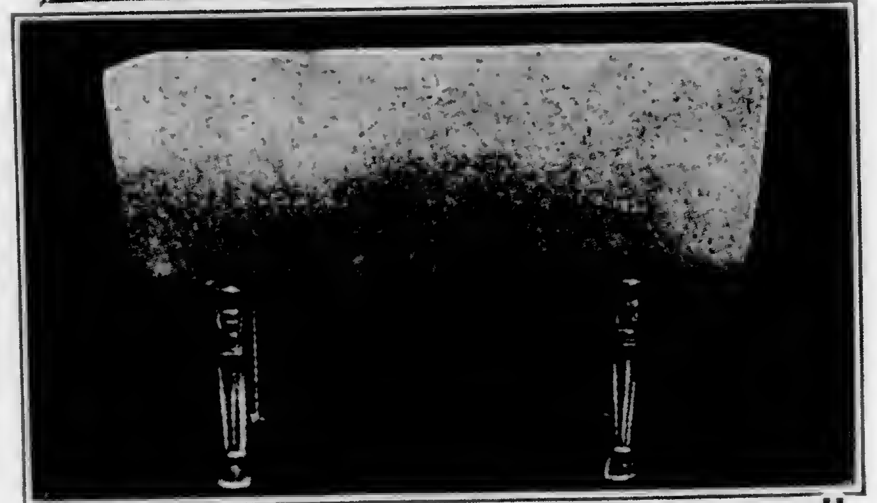

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An Interesting Booklet

All persons having wood finishing to do should write for the Modern Wood Finishing booklet recently issued by a concern whose goods have been on the market for many years and are universally recognized as the standard by all architects and leading paint contractors and furniture manufacturers.

This book not only gives full informaiton on the subject in a condensed, practical form, but also contains accurate illustrations in natural colors of a number of finishes on different kinds of wood.

It will be gladly sent free for the asking if you will write The Bridgeport Wood Finishing Company, New Milford Connecticut; 55 Fulton Street, New York; 68-72 W. Lake Street, Chicago; 41-43 S. Third Street, Philadelphia, and 48 Cornhill, Boston.

The Pacific Coast representatives are the Whittier-Coburn Company of San Francisco and Los Angeles.

New Book

One of the latest books published by the D. Van Nostrand Company of New York is an interesting volume entitled "Architectural Composition," by J. B. Robinson. The book is profusely illustrated with 88 half tones and 85 line drawings.

Burnett Iron Works to Build

The J. H. Burnett Iron Works of Fresno is supplying all the steel for the new Japanese bank in the Raisin City and has the contract for the structural steel for the new County Orphanage from plans by Architect Mathewson. The steel work for the Odd Fellows building at Santa Rosa was also supplied by the Burnett Company which has found it necessary to expand and Manager Burnett has in mind the erection of a new foundry on recently acquired ground adjoining the present plant.

Reductions in Lumber Tariff

The announcement that the interstate commerce commission has decided to make sweeping reductions in lumber rates west of the Missouri river, and a five per cent reduction in the advanced rates in the East ends the contention which for the past eight months has tied up the lumber industry of the Northwest. The immediate effect of the decision, however, will be of questionable effect. At present the demand from the Orient is almost nil, and the shipments to California ports has decreased largely and there is little or no demand from the East. The ruling is calculated to be of much benefit to the coast in general.

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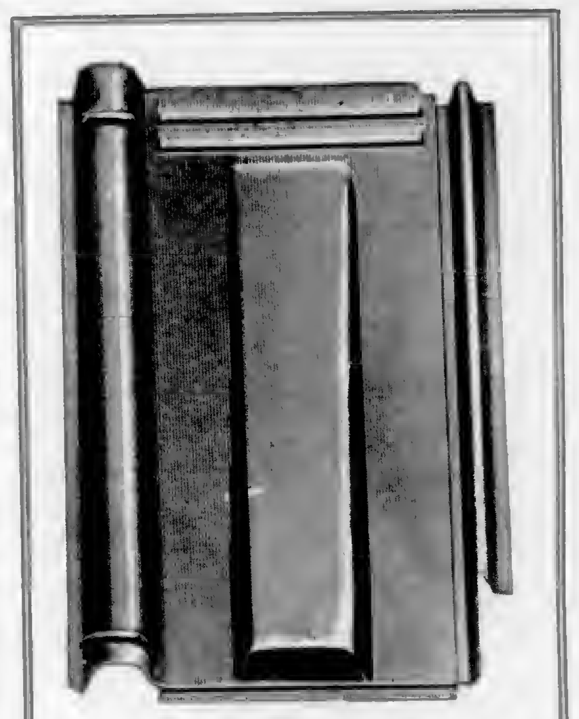

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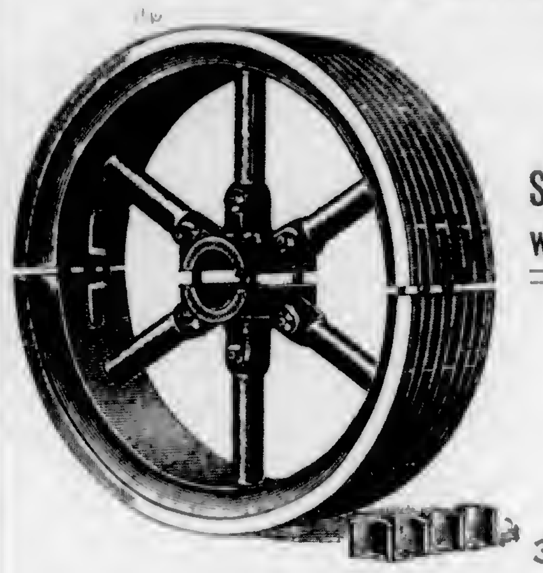

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Returns from Europe

Architect Charles M. Rousseau has recently returned from a year's journey abroad with Mrs. Rousseau. He visited every foreign city of note and studied the architecture in each place. He was agreeably surprised to note the rapid progress made in construction work in San Francisco. He says the whole world marvels at San Francisco's wonderful grit and enterprise and he predicts that the next two or three years will see a greater exodus of permanent settlers to the Pacific Coast than ever before.

Class in Structural Engineering

The San Francisco Architectural Club announces a course of lectures in the structural design and construction of buildings, by Professor Charles Derleth, Jr., of the Engineering Department, University of California.

The course will prove of great value to advanced students, as Mr. Derleth has just completed a six months' course in elementary principles and the present lectures will be a continuation of the work already accomplished.

The class will meet every Thursday evening from 7:30 to 9:30 o'clock at the Club rooms, No. 568 Golden Gate avenue, San Francisco.

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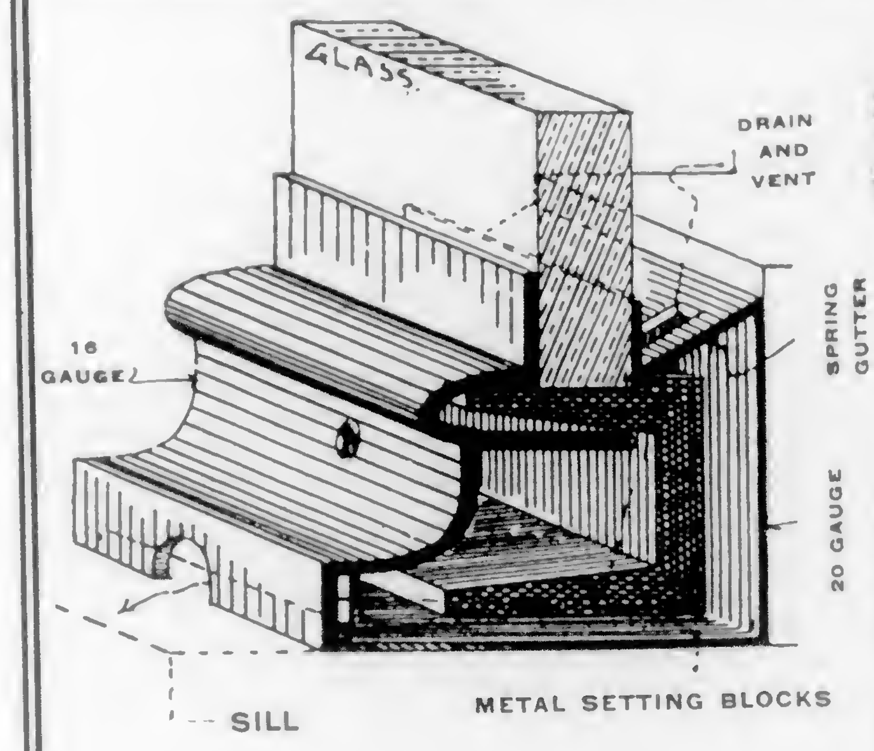

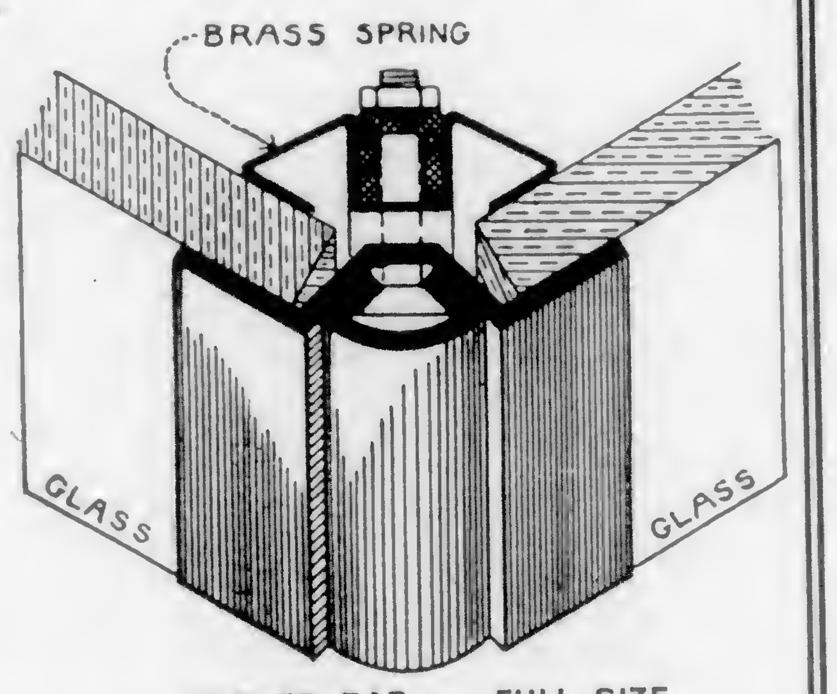

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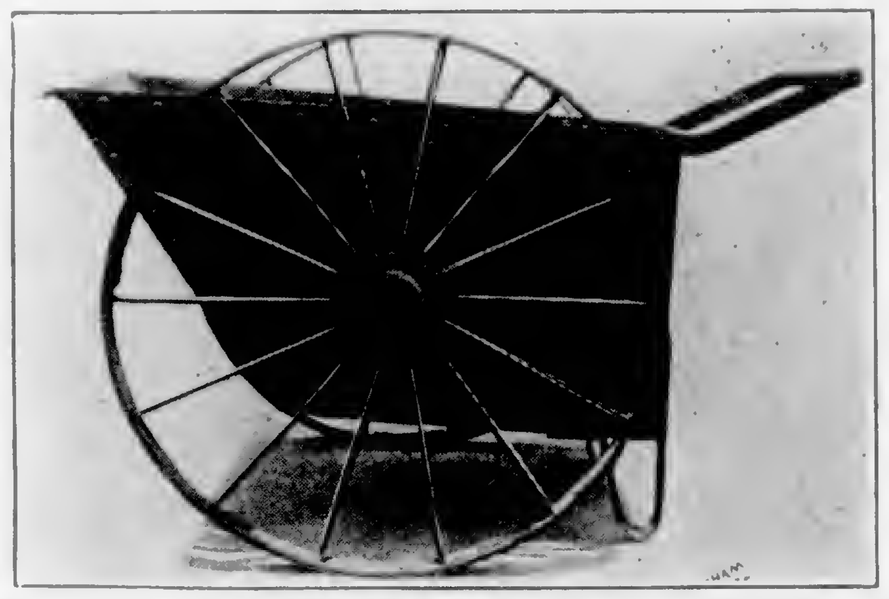

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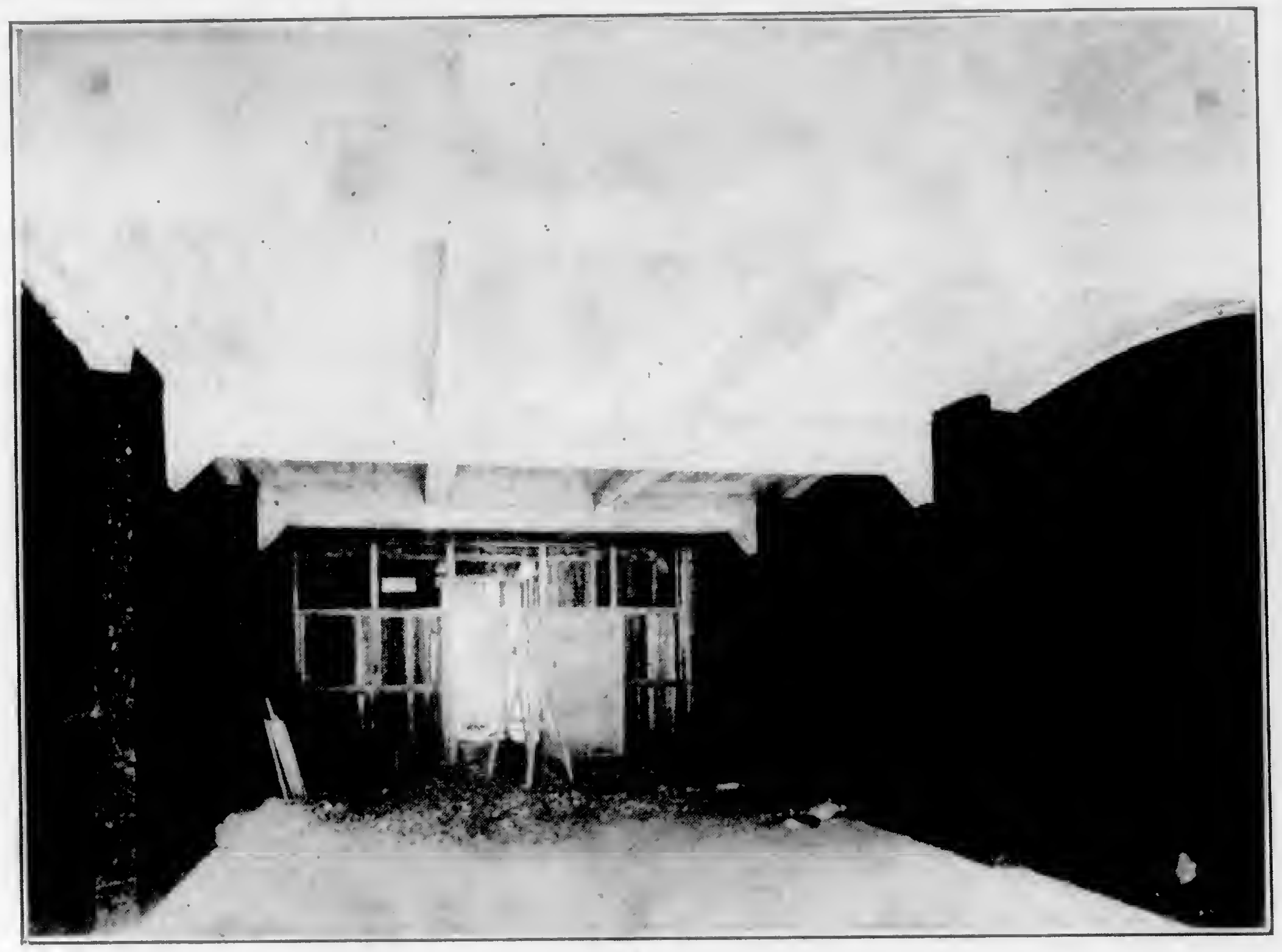

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The John's Patent Door Hanger

A new door hanger, built on lines consistent with modern improvements, is the John's device, invented by and manufactured by John Handschumacher of 4437 Twentieth street, San Francisco. The hanger is handled by the San Francisco Hardware Company of 3069 Sixteenth street, who report a constantly increasing demand for the device. Leading architects and builders, they report, are using the hanger for residences as well as apartments and flats.

John's hanger is claimed by the manufacturer to be the simplest and most practical hanger on the market. The track is two-pieced, hardwood faced, and comes in any desired length and can be put into position in one-quarter of the time it takes to set any other track. The stem of the hanger which passes through the jambs is less than one-eighth of an inch thick, thus allowing the jambs to come almost together which stops drafts, and gives the door a neat and finished appearance.

More Waterproofing Contracts

The L. E. Boyle Company succeeds the Boyle-Luey Company, municipal contractors and dealers in builders' supplies, Monadnock building, San Francisco. Mr. Luey retires from the company and Mr. Boyle becomes the president and manager. The company is having remarkable success in getting its Hydrex felt and waterproofing specified in the big buildings under way in San Francisco and near-by cities. Besides the Palace Hotel, Mr. Boyle has lately contracted to waterproof the basement walls of the new Tourist Hotel at Stockton and the eight-story Postal Telegraph building in San Francisco.

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Architects' Meeting.

A special meeting of Southern California Chapter, A. I. A., was held the latter part of June to consider and act on a large amount of correspondence which had been received by Secretary Fernand Parmentier, and which required attention.

President C. H. Brown announced that Geo. F. Costerisan and Albert R. Walker had been elected to membership in the Chapter.

The meeting was concluded with an executive session for the consideration of matters of a private nature.

New Tile Firm

M. Kilwan and Joseph Donovan, formerly with the Bush & Mallett Company, now defunct, have gone into business for themselves and are making a specialty of sanitary wall and floor tiling for bath rooms, toilets, sinks, vestibules and public hallways. Mr. Kiwan was with Bush and Mallett in various capacities from foreman to manager for twenty years while Mr. Donovan was connected with the same firm for thirteen years. The firm have a very tasty show room at 157 Fifth street, below Mission, San Francisco, where a large stock of tile is carried. The firm also handles pressed brick for building purposes, and clinker brick and fire tile mantels.

Architects Form Partnership

Ralph C. Lampe, who is well known in California, has entered into partnership with Fred J. Berg of San Francisco, where they have opened architectural offices in the Metropolis Bank building. Mr. Lampe formerly was located in business in Los Angeles.

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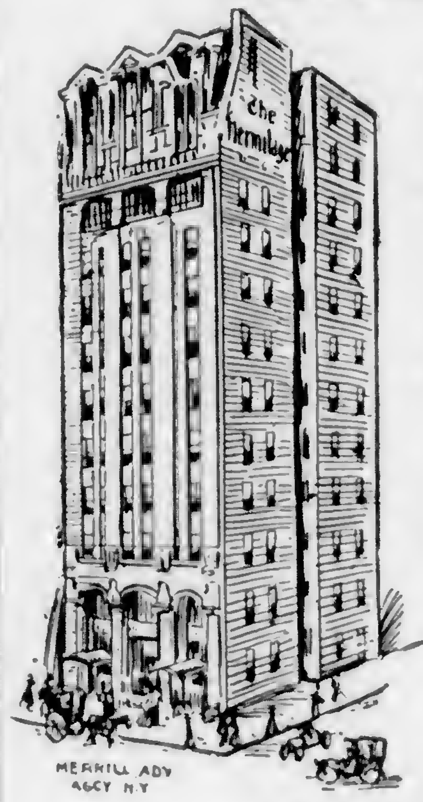

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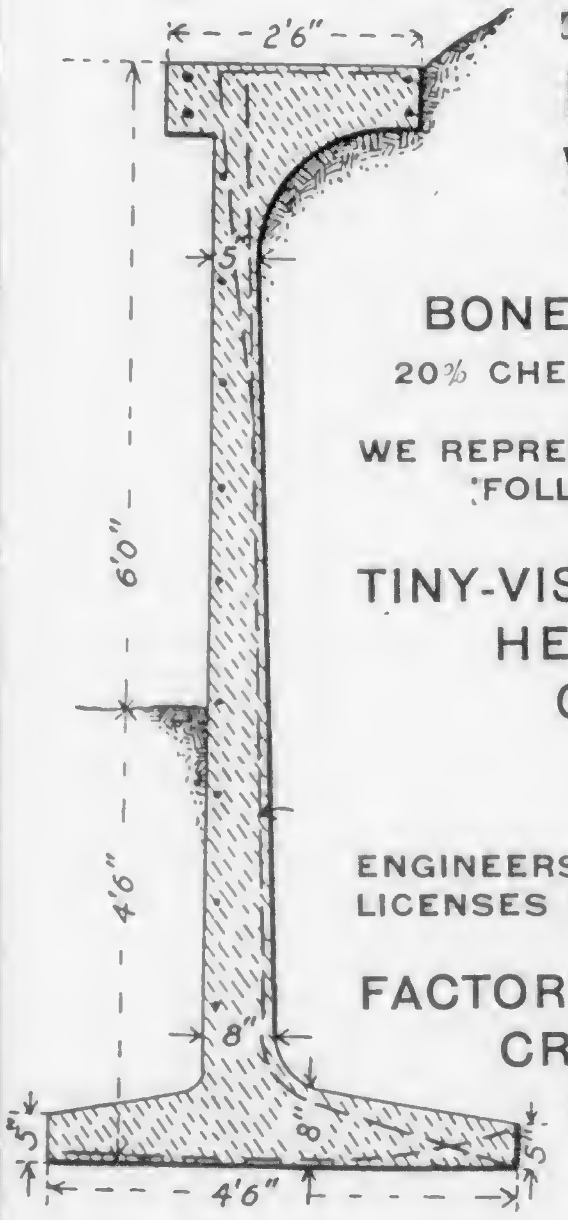

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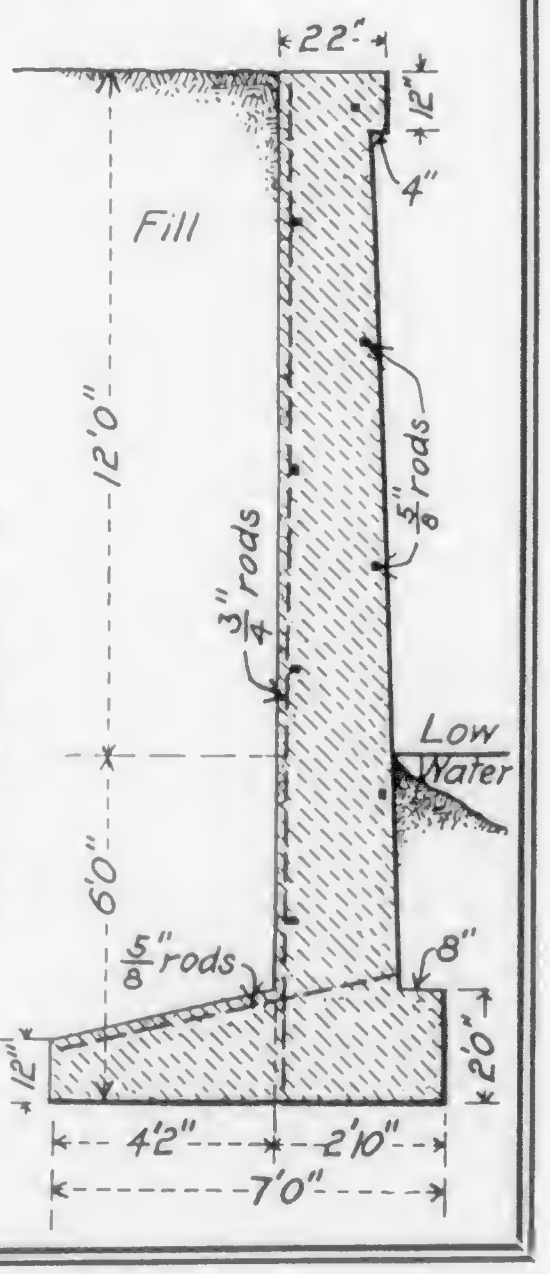

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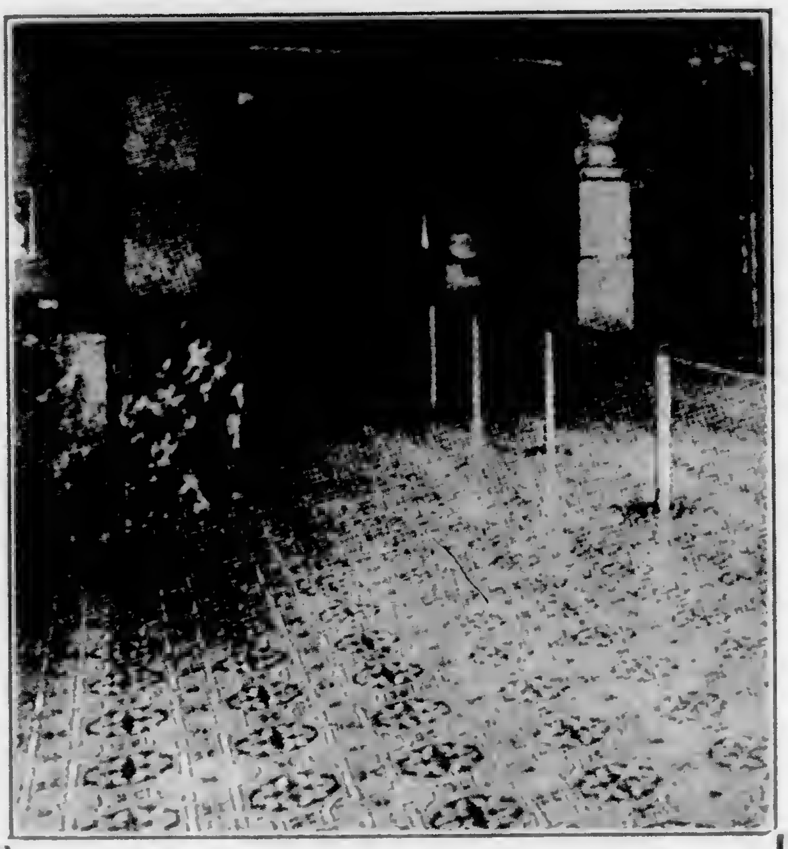

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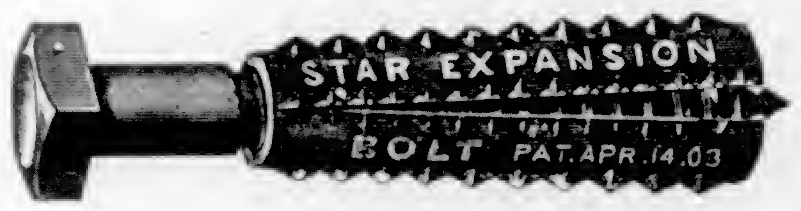
Modern Requirements and Modern Methods

In connection with the erection and finishing of the average modern structure, there are many fastenings of one description or another, to be made to brick, stone, marble, tile, concrete, and other masonry.

In the old days, one first used wood plugs, which were never satisfactory, because, as is well known, wood expands and contracts under climatic changes to such an extent that the fastening is never positively secure. Then, too, and really more important is the fact that in a very short time the wood plug will rot away, so that the fastening at best is only temporary.

Next came what is known as the "Leading-in" process, which while no end messy, and tedious really did mark an improvement over the unstable wood-plug method. In "Leading-in" the hole to be drilled is necessarily a very large one, for it must provide not only for a space to accommodate the bolt or screw, but also for pouring in around the same a quantity of molten lead, which cooled and hardened made a fastening at least secure. This tedious process while an improvement, only served to emphasize the necessity for a better way.

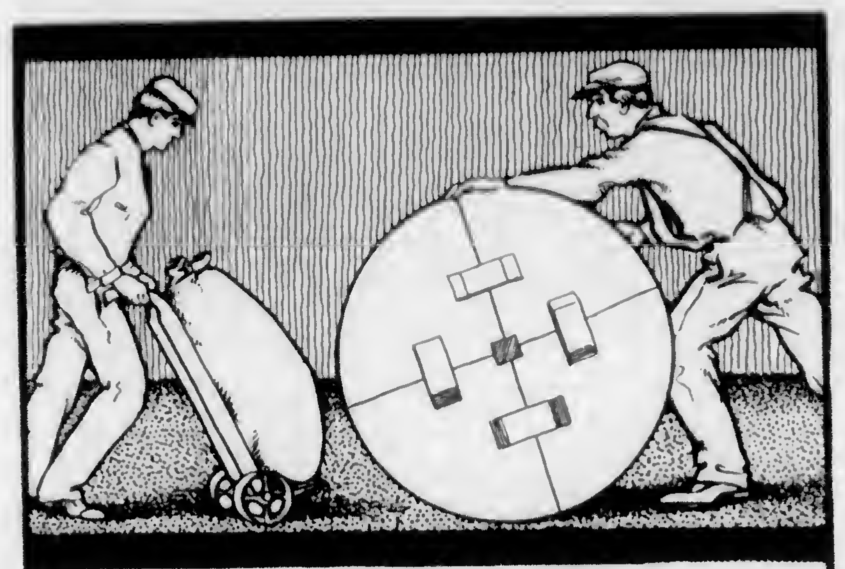
Then came the Star Expansion bolt, designed and produced along studied practical ideas, in various sizes to conform to the ordinary Bolts and Screws in every-day use the country over. The principle involved is so simple, the expanding qualities so positive and sure, the use and application so easy, the adaptability so wonderfully great, that it must seem that finally a really puzzling problem has been satisfactorily solved.



Star Expansion bolts and anchors in their many various styles and sizes have gained universal recognition as the modern improved means of making attachments of any sort to all kinds of masonry, marble, tile, slate, and like material. They are made in either mal iron, brass, or lead composition metal, in any size from ⅛ inch to 2 inches in diameter, to fit wood screws, lag screws, or machine bolts.

The advantages briefly summed are as follows: Smallest possible drilled hole for insertion. Ease in using—time and labor saved. Adaptability of expansion parts for use with stock bolts and screws. Positive expanding and holding qualities—strength, and a clean cut finished appearance, which ornaments rather than defaces surface matter.

Star Expansion bolts and anchors are daily demonstrating their time and labor-saving qualities to thousands of carpenters, builders, plumbers, electricians, iron workers, and others who have investigated the claims made for them. If our readers desire to become better posted we have arranged with the manufacturers. The Star Expansion Bolt Company, of Bayonne, N. J., to send samples and catalogue (completely descriptive of a line comprising expansion bolts, toggle bolts, and drills for brick and stone) promptly upon direct application to the Bayonne office.



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We can prove every claim for "Watsonite" to your complete satisfaction—otherwise we couldn't for one moment afford to make any of them.

We proved them to John A. Roebling & Sons Co. Their business involves the hardest test ever put to *any* flooring—20,000 pounds pressure per square foot made by huge spools of wire rope, beside ceaseless traffic of other heavy, wear-producing bodies. They *had* to have a floor *able* to stand the grind. We *proved* that "Watsonite" *could*—they were already familiar with other flooring materials—*result:* "Watsonite" covers basement and entire six floors of their new warehouse 92,000 square feet. And this is only *one* out of scores of others.

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A Book on Reinforced Concrete

"Reinforced Concrete, a Manual of Practice," is the name of a new book by Ernest McCullough, C. E., which has just been turned out by the printers.

The work is unique for the following reasons:

First. It is written for men not technically educated by a highly educated engineer.

Second. The author has personally erected many of the buildings he has designed. Few of the concrete books on the market have been written by men of such broad practical experience.

Third. Nearly all the matter is original, and not compiled. The author tells "how to do" things.

Fourth. Statements are accurate and in clear language, as might be expected from a man who has been writing for so many years.

The book was prepared to meet what has appeared to be a distinct demand for a working manual, full of practical helps, and with as little as possible of theoretical discussion.

The price of the book is $1.00 postpaid, 842 Monadnock Block, Chicago, Ill.

Another Good Contract

Construction work has been started in earnest on two receiving buildings and one building for the care of the demented at Agnew, Cal. The buildings are to be erected on the grounds of the State Hospital, near San Jose. They will be of brick and concrete and a large amount of terra cotta, stone, iron, tinning, galvanized iron and slating is specified. The buildings will be supplied with steam heating, electrical and modern plumbing specialties. The general contract for the work has been awarded to the F. O. Engstrum Co., of Los Angeles, on their bid of $221,999.

WANTED BIDS

Reinforced Concrete or Material for Same

The Board of Control of the Territory of Arizona will receive up to noon of the 30th day of July, 1908 sealed proposals for the erection of three or more buildings, 46 by 186 feet, one story; one building 54 by 54 feet by 20 feet high, tunnel 325 feet long and 2400 feet of wall 20 feet high, all of reinforced concrete construction; also separate proposals for materials for same.

Proposals to be for completed structures or for materials f. o. b. Florence, Pinal County, Arizona. For information apply to Thornton Fitzhugh, architect, Phoenix, Arizona.

The right to reject any and all bids is reserved by the Board.

By order of the Board of Control.

JAMES J. RIGGS,
Secretary.

WANTED BIDS

Mechanical Plant

The Board of Control of the Territory of Arizona will receive up to noon of the 30th day of July, 1908, sealed proposals for a mechanical plant for the Territorial Prison at Florence, Pinal County, Arizona.

For information apply to Thornton Fitzhugh, architect, Phoenix, Arizona.

The right to reject any and all bids is reserved by the Board.

By order of the Board of Control.

JAMES J. RIGGS,
Secretary.

Aquabar

As its name implies, is a bar, a stop or obstruction to water, and is such an obstruction to its passage through cement or concrete as will make it perfectly impervious to moisture.

It is a solution with which any hydraulic or building cement may be tempered, and it is a practical impossibility to force water through the mortar or concrete. even under heavy pressure.

Experts have tested it, engineers and builders have used it, and practical men in all branches of constructive work testify to the efficacy of Aquabar in waterproofing cement and cement structures, and find it to be the only material that will thoroughly and permanently serve the purpose of its invention and production.

It is a water-like solution of such composition as will never evaporate from or lose its obstructive qualities in cement or concrete work from age, and while slightly retarding the rapid setting of cement when tempered therewith, it in nowise affects or depreciates the strength.

The only action of Aquabar is that of filling all the voids or pores between the cement and sand to such an extent as to make the mortar when set entirely moisture and water-proof, and the mortar when mixed with Aquabar may be applied as a surface coating or plaster, or may be in joints, or in mass as a concrete, or as a facing for concrete work, and may be manipulated with the same freedom as water mixed cements or mortar, permitting even greater deliberation in its applications.

Heretofore all efforts to secure water-tightness in cement and concrete construction have involved one of the three following expedients:

1st. By adjusting the sizes of sand and stone, the amount of water and the placing of the material, to conditions not usually found in the ordinary construction of concrete work.

2d. By special treatment of surfaces.

A piece of bright steel, embedded in concrete, water-proofed with Aquabar, showed at the end of twenty-eight days on removal no signs of pitting or corrosion and had lost nothing in weight. It was bright and free from rust.

The experiments under the heading "Waterproofing Properties" clearly show that Aquabar is an efficient water-proofing agency not only for concrete building blocks, cement bricks, cement roofs, etc., but also for cisterns, stand pipes, deep reservoirs, cement conduits, etc., when the concrete work must be water-proof under pressure of water.

The water-proofing compound, Aquabar, does not to any practical degree injure the strength of concrete in which it is used. Any engineer would readily sacrifice 5 per cent in strength to have his concrete work impervious to water.

Aquabar does not attack or rust steel, and may be used safely with concrete in which expanded metal, rods, bars, etc., are to be imbedded.

Further information can be had by addressing American Cement Waterproofing Company, Twelfth and Noble streets, Philadelphia, Pa.

Installing Oil Burners

The G. E. Witt Company has recently completed an oil burning plant for the Goodyear Rubber Company at the latter's building at Twenty-ninth and Mission streets, San Francisco. The plant will be used to dry canvas oil coats, etc., manufactured by the Goodyear Company. Mr. Witt has also installed an up-to-date low pressure heating plant in the Murphy-Grant building at Sansome and Bush streets, San Francisco.

Plants are being installed at the present time in the Home Telephone building on Grant avenue, San Francisco; the Gunst building at Geary and Powell streets, in the same city, and the Taft & Pennoyer building, Oakland.

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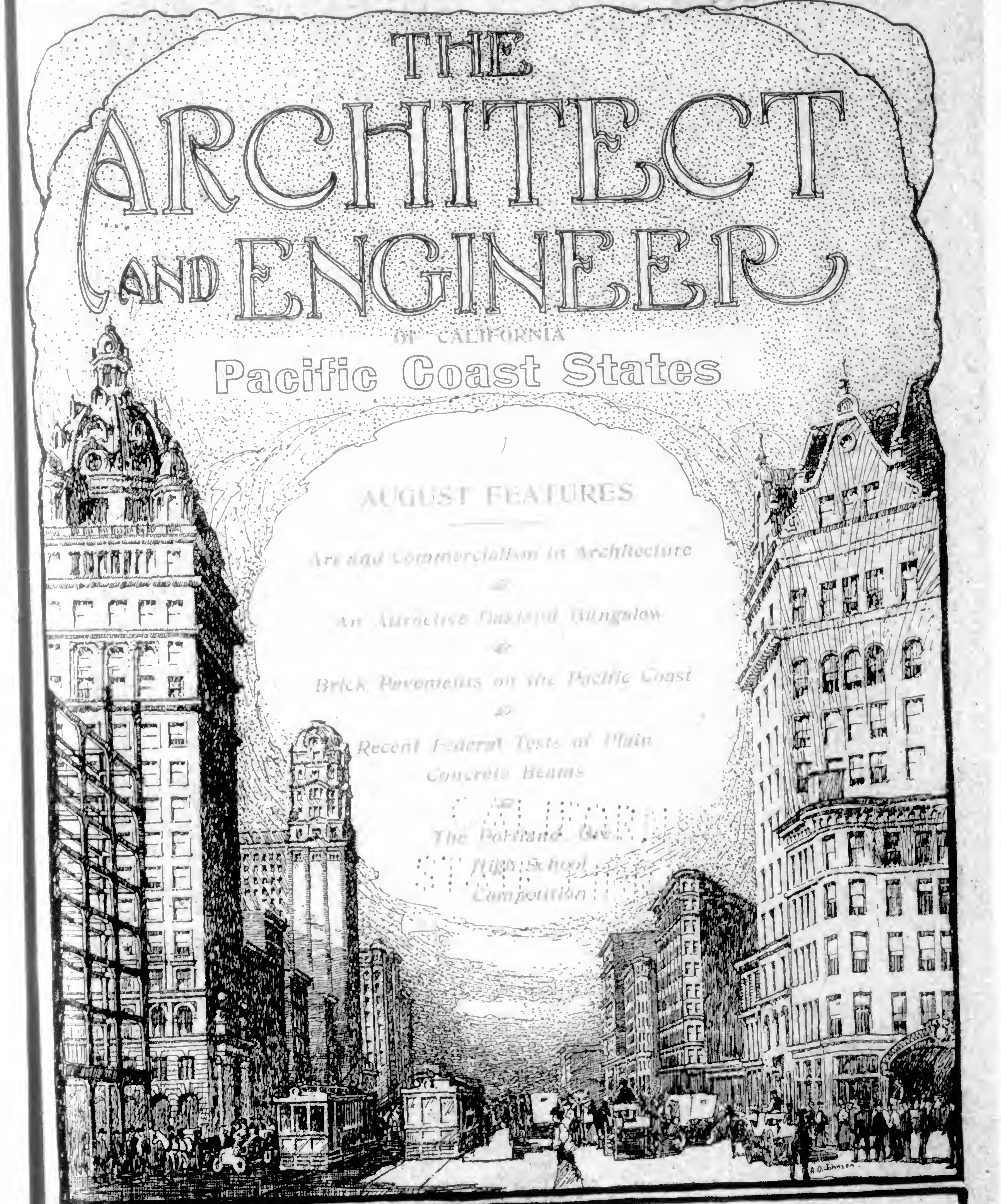

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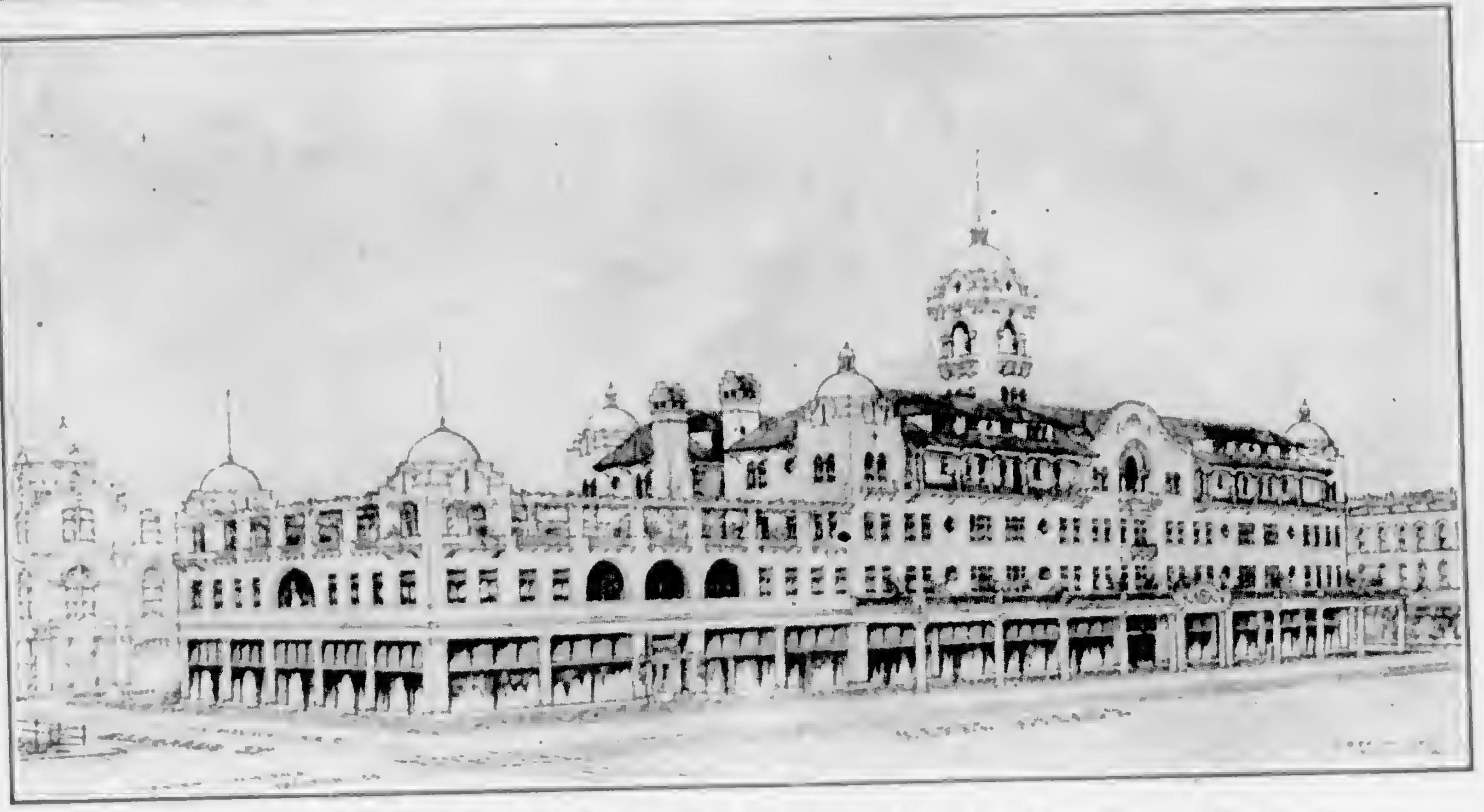

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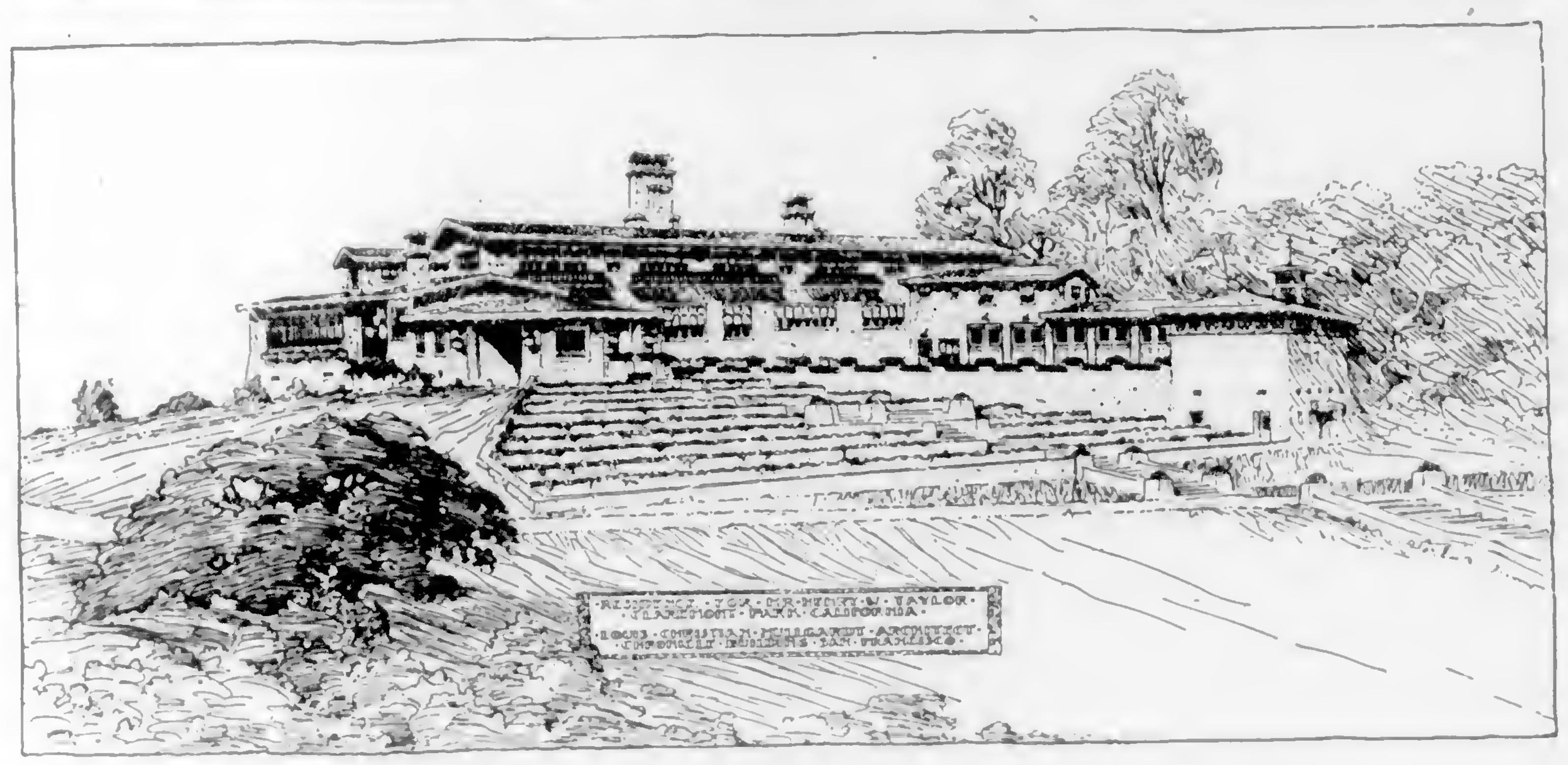

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Hydrex Damp Proof Paint, sold by
L. E. Boyle Co., Inc. Monadnock Bldg., S. F.

DOOR OPENER
G. Rischmuller..........Builders' Ex., S. F.
and 842 37th St., Oakland

DOOR HANGERS
Reliance Hangers ....(see page 104)
Pitcher's Hanger—The Pacific Tank Co.,
318 Market St., S. F.

"John's Hanger," sold by San Francisco
Hardware Co.,....3069 Sixteenth St., S. F.

DOORS—METAL
California Fireproof Door Co.,
1932 So. Main St., Los Angeles
Fred Nichols....1137 Sixteenth St., Oakland
Portland Sheet Metal Works,
E. 7th and E. Madison Sts., Portland

DOORS—VENEER
Northwest Door Co.,
Albina Ave., Portland

DRILLS, BRICK AND STONE
Star Expansion Bolt Co......Bayonne, N. J.

DUMB WAITERS
Wells & Spencer Machine Co.,
139-141 Beale St., S. F.

ELECTRICAL CONTRACTORS
California Elec. Construction Co.,
680 Mission St., S. F.
Central Electric Co..185 Stevenson St., S. F.
C. K. Claggett....66 Park St., Portland, Ore.
Hanbridge-Loyst Electric Co.,
564 Eddy St., S. F.
Butte Engineering Co..683 Howard St., S. F.
Enterprise Electric Works,
118 Eighth St., S. F.
Steger Electrical Works........Fresno, Cal.
Comet Electric Co............Portland, Ore.
Western Electric Works,
61 6th St., Portland, Or.

ELECTRICAL SUPPLIES
San Francisco Engineering Co.,
322 Sixth St., S. F.

ELECTRIC WIRING
Bradley Martin Co........164 Oak St., S. F.

ELECTRIC SIGNS
Bradley Martin Co........164 Oak St., S. F.

ELEVATORS
Van Emon Elevator Co.,
111 New Montgomery St., S. F.
Otis Elevator Company,
Stockton and North Point, S. F.
Western Elevator Co.,
801 Humboldt Bank Bldg., S. F.
Wells & Spencer Machine Co.,
139 Beale St., S. F.
Hammond Elevator Co.,
Seventh and King Sts., S. F.
Pacific Electric Engineering Co.,
213 Second St., Portland, Ore.

ENGINEERS
W. W. Breite...925 Golden Gate Ave., S. F.
Leonard, John B........Sheldon Bldg., S. F.
W. E. Leland..Merchants' Exc. Bldg., S. F.
Thos. Morrin..........15 Second St., S. F.
L. Mess & Co., C. E.'s,
Merchants' Ex. Bldg., S. F.
Cox & Vengelen......229 Pine St., Portland

FIRE ESCAPES
Standard Iron Works.........Portland, Ore.
Burnett Iron Works............Fresno, Cal.

FIRE EXTINGUISHERS
Goodyear Rubber Company,
587-591 Market St., S. F.

FIREPROOFING
Hudson Patent Block Co.,
Monadnock Bldg., S. F.
Demolith Co.... ..310 Clementina St., S. F.
Continental Fireproofing Co.,
908 Mutual Bank Building, S. F.
Western Expanded Metal Co.,
426 Crocker Bldg., S. F.
Roebling Const'n Co...Crocker Bldg., S. F.
Healy-Tibbitts Co.....Hansford Bldg., S. F.
Nat'l Fireproofing Co. Monadnock Bldg., S. F.
and Union Trust Bldg., L. A.

FIREPROOF FLOORING
Raecolith Company.....71 First St., Portland
61 Yesler way, Seattle
207 Builders' Ex., S. F.

FIRE DOOR HANGERS
California Fireproof Door Co.,
1932 S. Main St., L. A.

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ARCHITECTS' SPECIFICATION INDEX—*Continued*

FIREPROOF SHUTTERS AND DOORS
Jas. G. Wilson Mfg. Co.,
3 W. 29th St., New York, and
McCormick-Henderson Co.,
110 Bush St., S. F.

FIRE PROTECTION
Goodyear Rubber Company,
587-591 Market St., S. F.

FIREPROOF SHUTTERS
Larsen & Reed,
1325 Mission St., S. F.

FLOORING—ENGLISH BLOCK FLOOR
Jas. G. Wilson Mfg. Co.,
3 W. 29th St., New York, and
McCormick-Henderson Co.,
110 Bush St., S. F.

FLOOR POLISH
Butcher's Boston Polish Co.,
356 Atlantic Ave., Boston, Mass.

GAS FURNACES
Gas Furnace Co. ....226 Oak St., S. F.

GENERAL CONTRACTORS, ENGINEERS, ETC.
Wm. B. Abbitt Construction Co.......S. F.
Continental Fireproofing Co.,
Mutual Savings Bank Bldg., S. F.
B. J. Duffy.......3673 Seventeenth St., S. F.
Richard Keatinge & Sons, Williams Bldg.,
Third and Mission Sts., S. F.
Laughland & Schnebly Co.,
1443 Broadway, Oakland
Lange & Bergstrom
138 Investors' Bldg., S. F.
Long & Hoyt.....Monadnock Building, S. F.
Globe Const'n Co......Chronicle Bldg, S. F.
Ransome Concrete Co...Crocker Bldg., S. F.
John C. Ince Company,
406 Sutter St., cor. Stockton, S. F.
Hoyt Bros.,
Builders' Exchange, S. F., and Santa Rosa
Healy-Tibbitts Construction Co.,
106-11 Hansford block, S. F.
Leonard L. Jones,
1007 Humboldt Bank Bldg., S. F.
Litherland & Abrey.229 Beck Bldg., Portland
W. McKenzie ....734 Washington St., S. F.
Von der Horst Bros.,
Macdonough Bldg., S. F.
Peter Randolph Co.,
622 Chronicle Bldg., S. F.
Redmond, De Luca & Barzellotti,
628 Montgomery St., S. F.
Smith & Watson Co.....323 Lick Bldg., S. F.
C. P. Moore Building Co.,
703 Mills Bldg., S. F.
Hansbrough & Yorston,
716 Metropolitan Bank Bldg., S. F.

GENERAL INSPECTION
Western Inspection Bureau,
621 Monadnock Building, S. F.

GLASS
Povey Bros. Glass Co.,
Fifth and Flanders Sts., Portland

GLASS-PRISM, ART, ETC.
Cal. Art Glass Works..938 Howard St., S. F.
San Francisco Art Glass Works,
944 Mission St., S. F.
United Glass Co.........115 Turk St., S. F.
Munich Art Glass Co.....510 Turk St., S. F.

GLASS SETTING FOR STORE FRONTS
The "Kawneer" System, V. Dunkerley
669 Monadnock Bldg., S. F.

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Kruttschnitt Building Material Co.,
Monadnock Bldg., S. F.
John Cassaretto......245 Berry St., S. F.

HARDWOOD LUMBER
E. A. Howard Co.......20 Howard St., S. F.
King-Brown Co.,
First St., bet. Wash'n & Clay, Oakland
White Brothers,
Cor. Spear and Howard Sts., S. F.

HARD WALL PLASTER
Chubbuck & Harris....710 Mission St., S. F.
Empire Plaster Co.,
16th and Harrison Sts., S. F.
Marbleite Hardwall Plaster, sold by Western Building Material Co.,
340 Steuart St., S. F.
Adamant Company,
Worcester Bldg., Portland

HEATING AND VENTILATING
Burness & Martin.129 Sixteenth St., Portland
A. W. Curry.......116 Grand Ave., Portland
T. C. Thronson,
415 Hawthorne Ave., Portland
Thos. E. Hulme & Co.,
275 Fifth St., Portland
C. L. Johnson & Co.,
285 Grand Ave., Portland
Gardner & Kendall Heating Co.,
40-42 Second St., Portland, Ore.
Jordan Flue Block Co........Ashland, Ore.
Machinery and Electrical Co.,
351-353 N. Main St., Los Angeles
Globe Heating and Ventilating Co.,
1937 Market St., S. F.
Solar Heater Co.,
333 New High St., Los Angeles
Mangrum & Otter, Inc..507 Mission St., S. F.
Pacific Blower & Heater Co.,
3261 17th St., S. F.
Gilley-Schmid Co., Inc.,
13th and Mission Sts., S. F.

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Cox & Vengelen..229 Pine St., Portland, Ore.
W. E. Leland....Merchants Ex. Bldg., S. F.

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O. Barbi...............528 Hyde St., S. F.
Ideal Concrete Construction Co.,
102 Grand ave., Portland, Or.
"Roman Stone," mfrd by Cement Products
Co....................Balboa Bldg., S. F.

INSURANCE
Pacific Surety Co..326 Montgomery St., S. F.
Voss, Conrad & Co., Monadnock Bldg., S. F.
Standard Marine Ins. Co.,
Montgomery and Sacramento Sts., S. F.

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J. Llewellyn..........412 Kearny St., S. F.
and 1325 Telegraph Ave., Oakland
Schastey & Vollmer,
1930 Van Ness Ave., S. F.
A. W. Reiber Co...1607 Broadway, Oakland
L. Tozer & Son........1527 Pine St., S. F.
W. W. Tucker,
14th and Webster Sts., Oakland

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Western Builders' Supply Co.,
680 Mission St., S. F.

LAUNDRY MACHINERY
Western Laundry Machinery Co.,
58-60 Fremont St., S. F.

LAUNDRY TRAYS
J. F. Reilly & Co.....23 Spencer Place, S. F.

LIGHTING FIXTURES
Barrett's Lighting Fixtures,
408 Morrison St., Portland Ore.
The Enos Company..1748 California St., S. F.
Adams & Hollopeter....745 Mission St., S. F.
Welsbach Co.......351 McAllister St., S. F.
Morrison Electric Co.,
291 Morrison St., Portland

LIME
Union Lime Company,
209 San Pedro St., L. A.
Holmes Lime Co...Mutual Bank Bldg, S. F.
Monterey Lime Co.,
St. Clair Bldg., 16 California St., S. F.

LUMBER
Pope & Talbott......Foot of Third St., S. F.
Redwood Manufacturers Co.,
453 Bryant St., S. F.
57th St., Oakland
E. K. Wood Lumber Company,
Santa Marina Bldg., 112 Market St., S. F.
Oregon Planing Mills,
Nineteenth and Vaughn Sts., Portland, Or.

MACHINERY AND MACHINERY SUPPLIES
Eby Machinery Co.....Hansford Bldg., S. F.
Kelsey & McEvoy....313 Howard St., S. F.
Steiger & Kerr Stove & Foundry Co.,
Folsom and 18th Sts., S. F.

MARBLE
California Marble & Construction Co.,
207 Grant Bldg., S. F.
Italian & American Marble Works,
16th and Carolina Sts., S. F.
Calif. Peerless Stone and Tile Co.,
109 O'Farrell St., S. F.

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MARBLE—Cont'd
Baxter Marble Co..........Call Bldg., S. F.
American Marble & Mosaic Co 124 Harriet St., S. F.
Columbia Marble Co., 268 Market St., S. F.
Pacific Marble Works, 14th and Shotwell Sts., S. F.

MATTING RUBBER AND TILING RUBBER
Goodyear Rubber Company, 587-591 Market St., S. F.

METAL CEILINGS
Fogle & Mauer Co., representing Canton Art Metal Co...532 Monadnock Bldg., S. F.

METAL AND STEEL LATH
"Rib-Lath," Trussed Concrete Steel Co., Detroit, Mich.
"All United Steel Studding," Lilley & Thurston Co...82 Second St., S. F.

METAL SHINGLES
San Francisco Metal Stamping & Corrugating Co........296 Eleventh St., S. F.
Meurer Bros., rep. by J. A. McDonald, Builders' Exchange Bldg., S. F.

METAL WEATHER STRIPS
Williams & Carter Co., 197 Jessie St., S. F.

METAL WINDOWS
Portland Sheet Metal Works, Portland, Ore.

MOTORS, GENERATORS, ETC.
Engineering & Maintenance Co., 195 Fremont St., S. F.
San Francisco Engineering Co., 322 Sixth St., S. F.
Western Electric Works, 61 Sixth St., Portland

MORTAR STAINS
Western Builders' Supply Co., Representing Clinton Metallic Paint Co., Clinton, N. Y.

OFFICE BUILDING DIRECTORIES
McCormick & Henderson...110 Bush St., S. F.

OIL BURNERS
Bennett's Petroleum Burner Co. 579 Howard St., S. F
S. T. Johnson Co....1334 Mission St., S. F
G. E. Witt Co.......1165 Howard St., S. F.

OIL—CRUDE FUEL
Associated Oil Co...Wells, Fargo Bldg., S. F.

ONYX
Salmons-Ernsting Co., Representing New Pedrara Mexican Onyx Co., G. A. Bushert, Agt., 10 Third St., S. F.

ORNAMENTAL IRON
Frauneder Ornamental Iron Works, 860 Webster St., Oakland
Golden Gate Structural and Ornamental Iron Company..........107 Eleventh St., S. F.
C. Farrenkopf & Sons..623 Minna St., S. F.
Portland Sheet Metal Works..Portland, Ore.
Portland Wire and Iron Works, Portland, Ore.
Western Builders' Supply Co., Representing The L. Schreiber & Sons Co., Cincinnati.
Wagner Ornamental Iron Works, 473 Sixth St., S F.

ORNAMENTAL CEMENT WORK, CAPITALS AND BRACKETS
D. Ross Clarke....**Builders' Exchange, S. F.**
Western Builders' Supply Co., 680 Mission St., S. F.
Thos. Landy........**1673 Market St., S. F.**

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Sing Fat Co., Dupont and California Sts., S. F.
Sing Chong Co., 601 Dupont St., cor. California, S. F.

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BAY STATE BRICK AND CEMENT COATING.—Made by Wadsworth, Howland & Co. (Inc), See adv. in this issue for Pacific Coast agents.

PAINTS, OILS, VARNISHES, ETC.
Bass-Heuter Paint Co., 818 Mission, near Fourth St., S. F.
Clinton Metallic Paint Co., Clinton, N. Y., Pacific Coast Agents, Western Builders' Supply Co., 680 Mission St., S. F.
Paraffine Paint Co., Merchants Exchange Building, S. F.
Oregon Paint & Varnish Co., 93 Grand Ave., Portland, Ore.

PLASTERER
Clarke, D. Ross......708 Pacific Bldg., S. F.

PLUMBING
Fox & Co.......209 Second St., Portland
M. L. Kline... ....84 Front St., Portland
Taylor & Stanton......308 Pine St., Portland
Thos. E. Hulme.......275 Fifth St., Portland
The Gauld Co..:9 North Front St., Portland
J. F. Shea.Second and Ankeny Sts., Portland

RAILROADS
Southern Pacific Company, Flood Bldg., S. F.
Corvallis & Eastern Ry........Portland. Ore.

ROOFING AND ROOFING MATERIALS
Asbestos Roofing, H. W. Johns-Manville Co..................180 Second St., S. F.
Mackenzie Roof Co., 427 Fifteenth St., Oakland
Pacific Coast Paper Co..307 Market St., S. F.
The Watson Roof Co., French Bank Bldg., 110 Sutter St., S. F.
Western Builders' Supply Co., 680 Mission St., S. F.
W. H. Wilson......42-44 Natoma St., S. F.
Paraffine Paint Co., Merchants' Exchange Bldg., S. F.

ROOFING CONTRACTORS
W. H. Wilson & Co., 42-44 Natoma St., S. F.

ROLLING DOORS AND SHUTTERS
Jas. G. Wilson Mfg. Co..3 W. 29th St., N. Y.
McCormick-Henderson Co., 110 Bush St., S. F.
Louis R. Bidell..720 Broadway, Los Angeles

ROLLING PARTITIONS
Jas. G. Wilson Mfg. Co., 3 W. 29th St., New York, and
McCormick-Henderson Co., 110 Bush St., S. F.

RUBBER STAMPS, ETC.
Patrick & Co............126 Bush St., S. F.

RUBBER TILING
Goodyear Rubber Co., 587 Market St., S. F. 61 Fourth St., Portland

SAFETY TREAD
American Mason Safety Tread Co., O. A. Giles, Agt., 131 Buchanan St., S. F.

SAND FOR CONCRETE
Kruttschnitt Company Monadnock Bldg., S. F.
Marysville Sand and Cement Block Co., Marysville, Cal.

SANITARY FLOORING
"Magnolith," Portland Sanitary Floor Co., 185 Jefferson St., Portland
"Raecolith," Pacific Builders Supply Co., Builders' Ex., S. F., and Raecolith Co., 71 First St., Portland

SANITARY SPECIALTIES
D. H. Gulick..............Lick Bldg., S. F.

SCHOOL FURNITURE AND SUPPLIES
C. F. Weber & Co.......1151 Polk St., S. F.
Spencer Desk Co....610 Sacramento St., S. F.

SHEET METAL WORK
Feldman & Sommer, 134-136 Fourteenth St.. S. F.

SIDEWALK LIGHTS
John McGuigan & Co., 1913 Mission St., S. F.

SLATERS' CEMENT
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SPANISH TILE
San Francisco Metal Stamping Co., 295 Eleventh St., S. F.
Meurer Bros.......Builders' Exchange, S. F.

SPIRAL CHUTES
Haslett Warehouse Co., 310 California St., S. F.

STABLE STALLS AND FIXTURES
Howe Scale Co..........143 Main St., S. F.

STAFF AND STUCCO WORK
Callahan & Manetta....344 Tenth St., S. F.
J. Fred Jurgewitz, 1017 E. 16th St., East Oakland
Thos. Landy, Junction of Valencia and Market Sts., S. F.

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C. A. Blume........185 Stevenson St., S. F.

STEEL FURNITURE, LOCKERS, ETC.
Chas. M. Finch...........Boyd Bldg., S. F.
Williams & Carter Co...197 Jessie St., S. F.

ARCHITECTS' SPECIFICATION INDEX—*Continued*

STEEL MOULDINGS FOR STORE FRONTS.
J. G. Braun, 537 W. 35th St., N. Y., and 322 S. Paulina St., Chicago

STEEL STUDDING AND LATH
Lilley & Thurston......82 Second St., S. F.
Bostwick Steel Lath Co..........Niles, Ohio
Rib Lath, 689 Trust Concrete Bldg., Detroit, Mich.

STREET PAVING
Worswick Street Paving Co., Union National Bank, Fresno

STRUCTURAL STEEL AND IRON
Brode & Clark Iron Works, 621 Howard St., S. F.
Burnett Iron Works...........Fresno, Cal.
City Iron Works....303 Front St., Portland
Dyer Bros......17th and Kansas Sts., S. F.
Metropolitan Iron Works, Ninth and Brannan Sts., S. F.
Woods & Huddart....356 Market St., S. F.
Pacific Rolling Mills, 17th and Mississippi Sts., S. F.
Pacific Iron Works...........Portland, Ore.
Western Iron Works....125 Beale St., S. F.
Joshua Hendy Iron Works, 75 Fremont St., S. F.
Northwest Bridge Works......Portland, Ore.

TANKS
Pacific Tank Company..318 Market St., S. F.
Concrete & Steel Engineering Co. Merchants' Exchange Bldg., S. F.

THEATER AND CHURCH SEATS AND SCHOOL FURNITURE
Spencer Desk Co...509 Montgomery St., S. F.
C. F. Weber & Company, 1151 Polk St., S. F.

TILE CONTRACTORS
Kirwan & Donovan......159 Fifth St., S. F.

TILE, MOSAIC, MANTELS, ETC.
Artistic Stone Mantel Co..344 Tenth St., S. F.
W. W. Montague & Co., Turk and Polk Sts., S. F.
Mangrum & Otter....561 Mission St., S. F.
Carquinez Brick & Tile Co., 257 Russ Building, S. F
Oregon Art Tile Co., 311 Stark St., Portland

TILE ROOF CONTRACTOR
Mark Kirkby, 226 Stimson Building, Los Angeles

"TRUSS-LOOP" STEEL LATH
The Bostwick Steel Lath Co., represented by McCormick & Henderson, 110 Bush St., S. F., and A. J. Capron, Ainsworth Bldg, Portland.

VALVE PACKING
"Palmetto Twist," sold by H. N. Cook Belting Co..........317 Howard St., S. F.

VENETIAN BLINDS, AWNINGS, ETC.
Jas. G. Wilson Mfg. Co., 3 W. 29th St., New York, and
McCormick-Henderson Co., 110 Bush St., S. F.

WARDROBES—HYGIENIC
Jas. G. Wilson Mfg. Co., 3 W. 29th St., New York, and
McCormick-Henderson Co., 110 Bush St., S. F.

WATER HEATERS
Pittsburg Heaters, represented by Jos. Thieben & Co., 585 Mission St., S. F.
Humphrey Co., 565 N. Rose St., Kalamazoo, Mich.

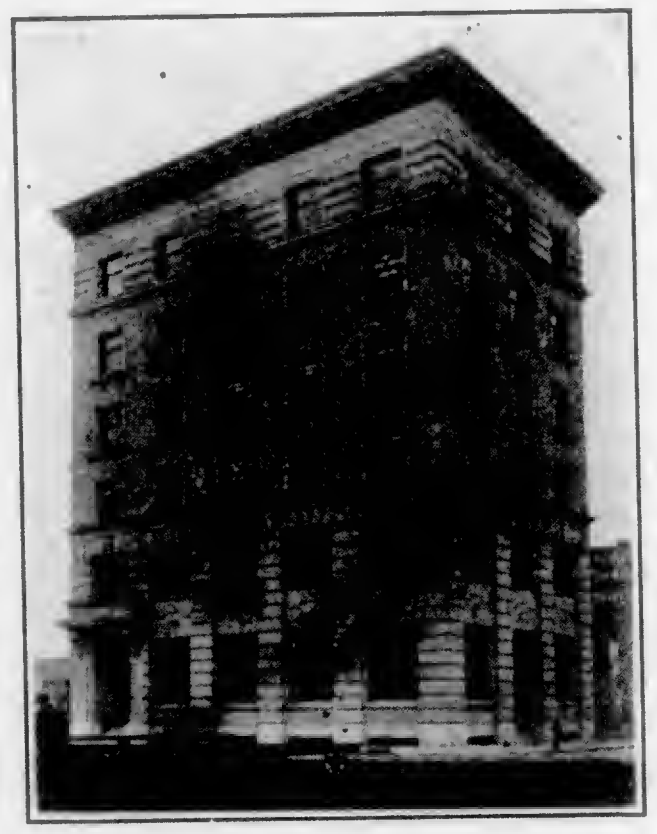
WATERPROOFING FOR CONCRETE, ETC.
The Building Material Co., Inc., 587 Monadnock Bldg., S. F.
"Hydrex Felt," sold by L. E. Boyle Co., Inc.................Monadnock Bldg., S. F.

WINDOWS, AUTOMATIC SASH LOCK
Automatic Sash Lock Co., 972 Alameda St., Los Angeles

WINDOWS, REVERSIBLE, ETC.
Atkinson Tilting Window, Monadnock Bldg., S. F., Second and Webster Sts., Oakland
Dean Reversible Window Co. 551 Brannan St., S. F.
Hipolito Screen & Sash Co., 634 Maple Ave., Los Angeles

WIRE LATH AND ROPE
John A. Roebling's Sons Co., 202 Second St., S. F.

WOOD FINISHING
Bridgeport Wood Finishing Co., Represented by Whittier, Coburn Co., 18 Sansome St., S. F.



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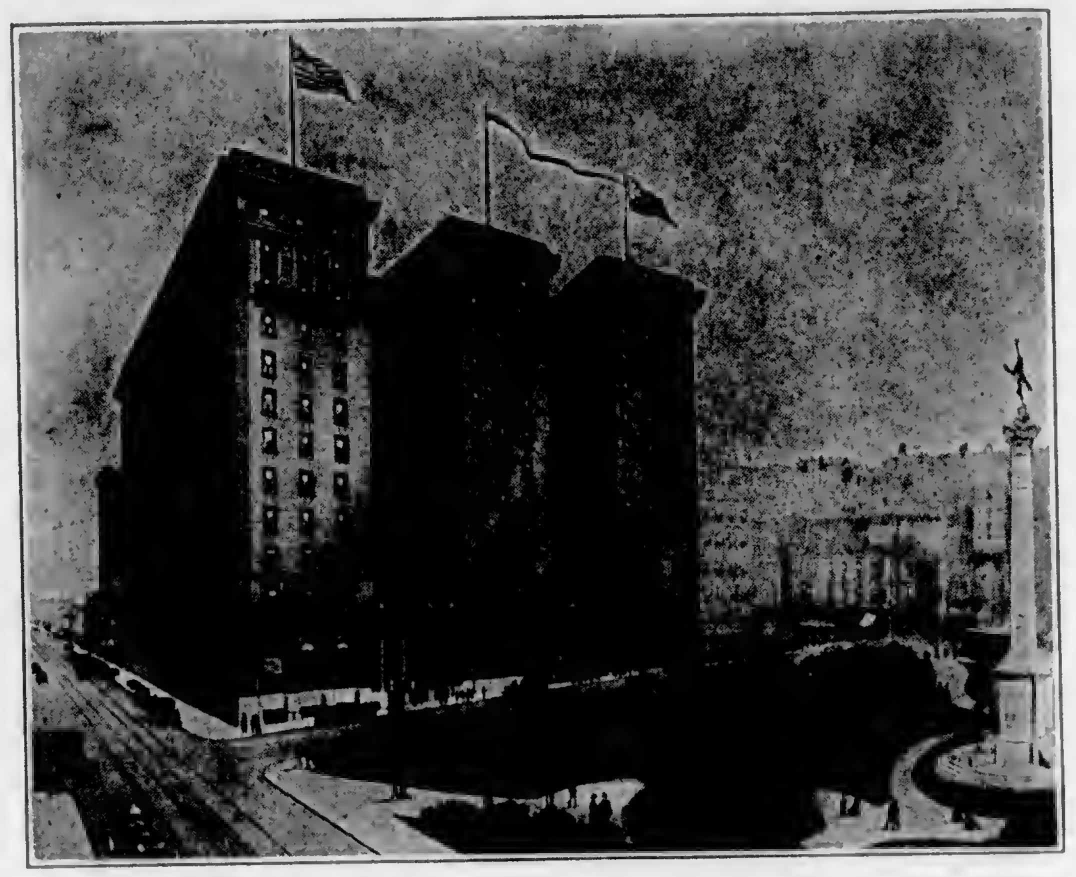

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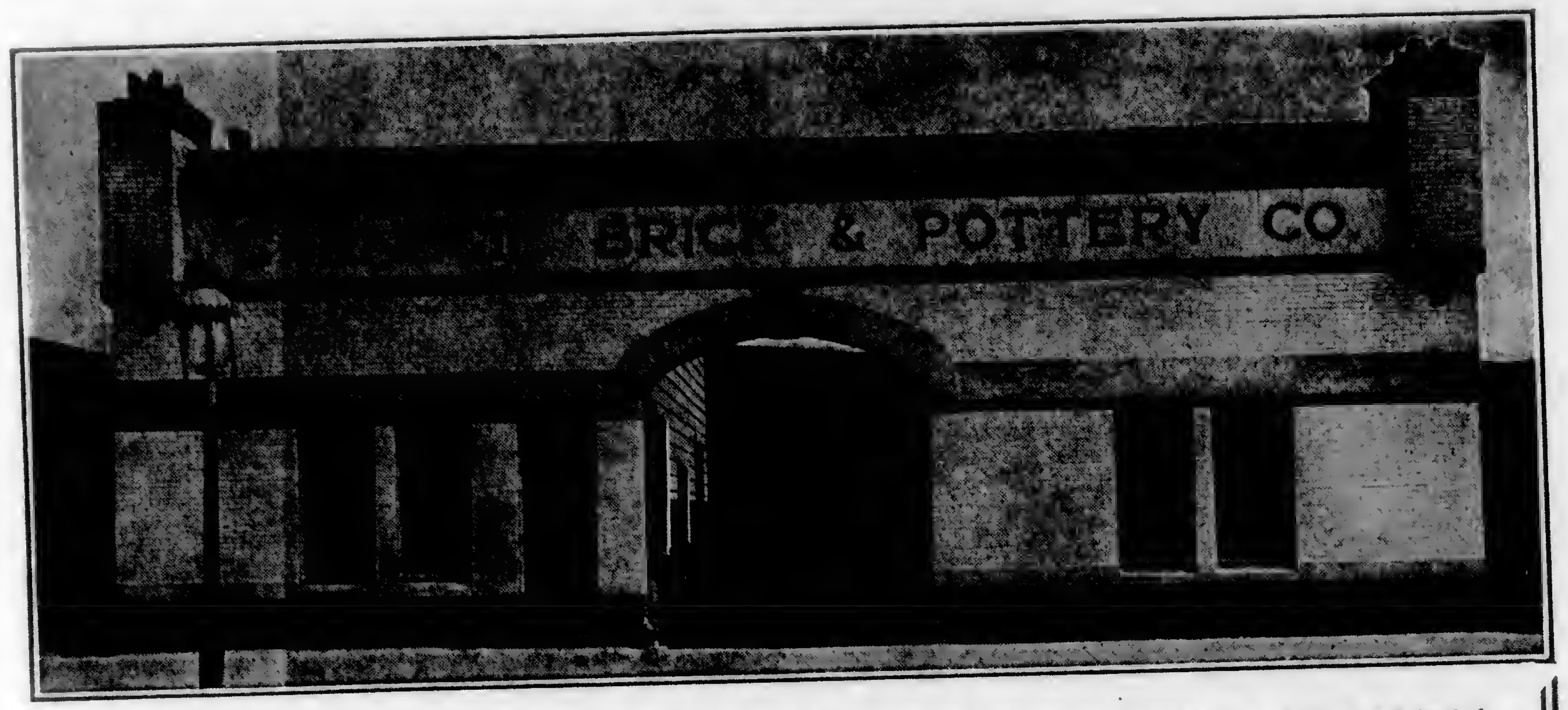

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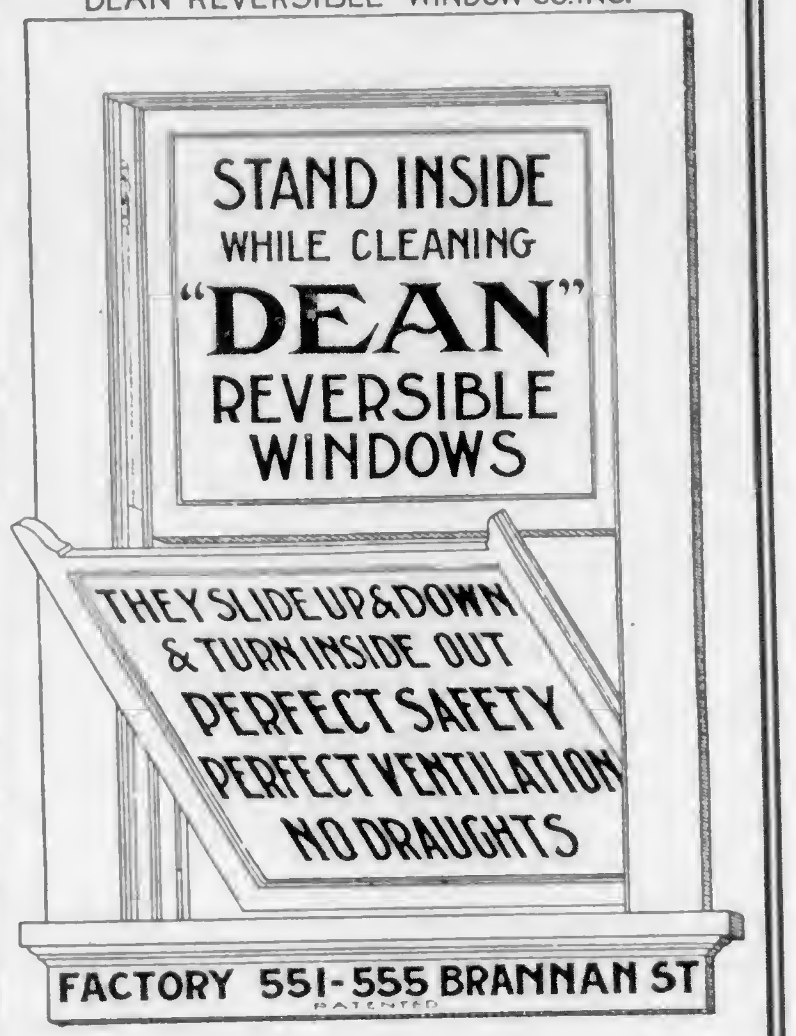

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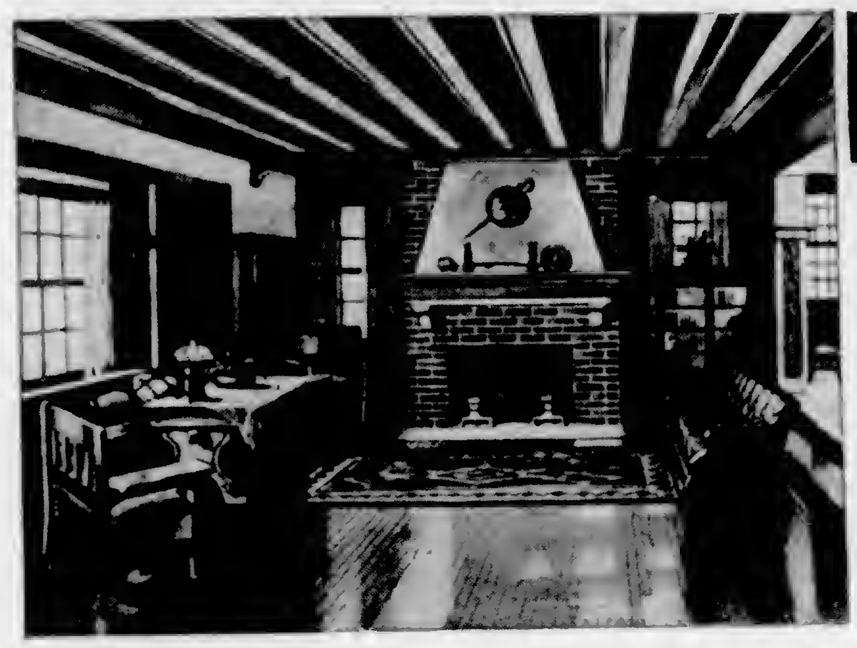

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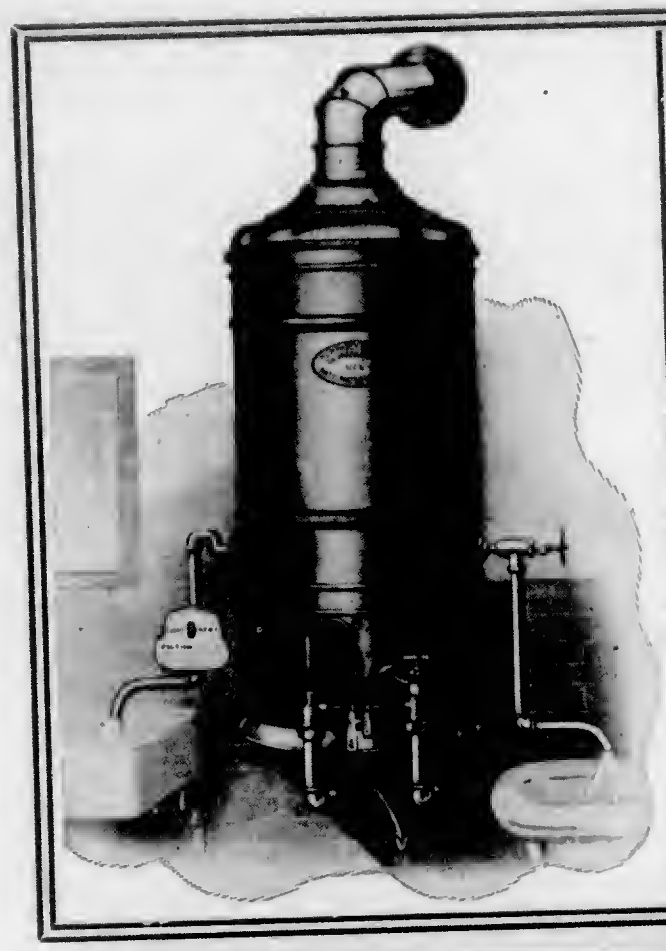

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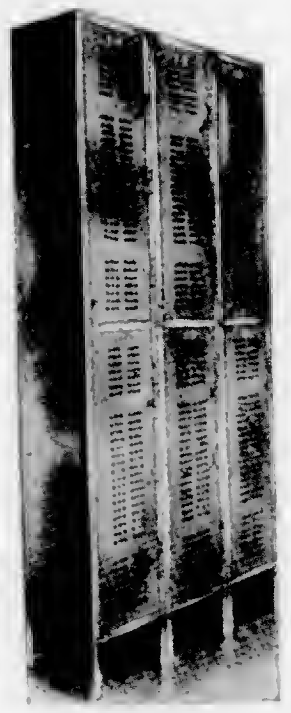

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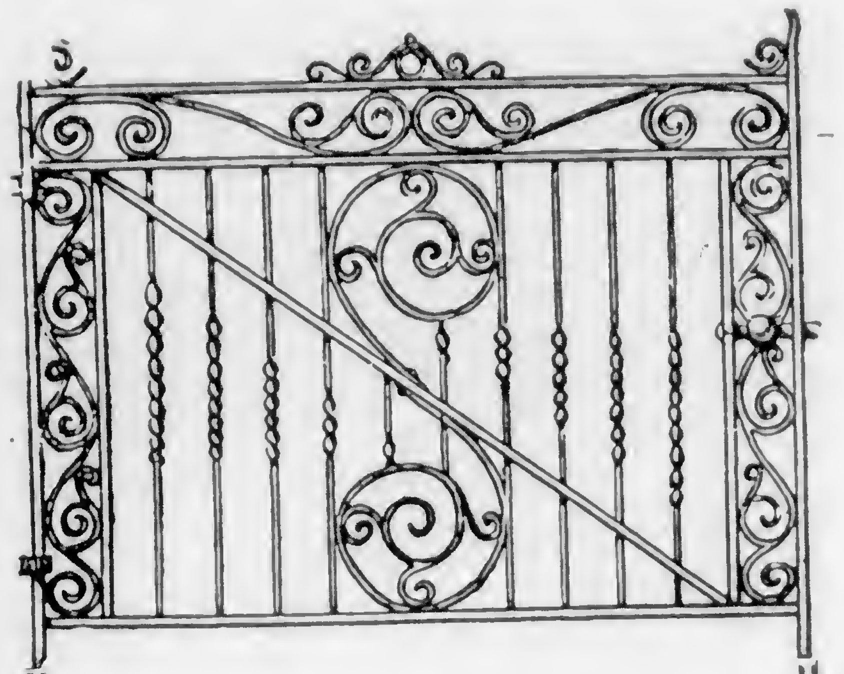

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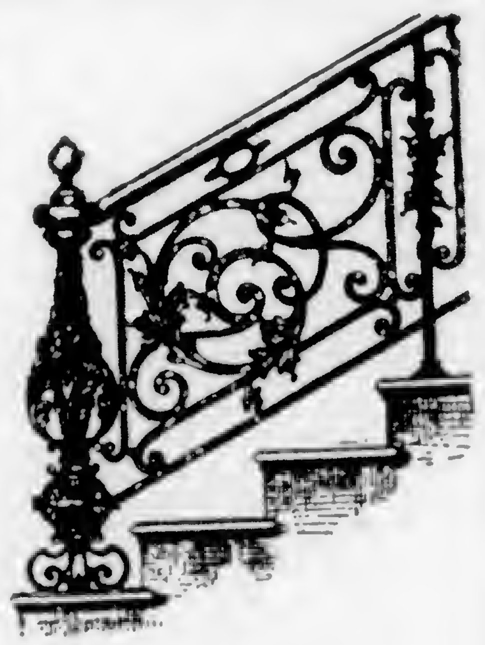

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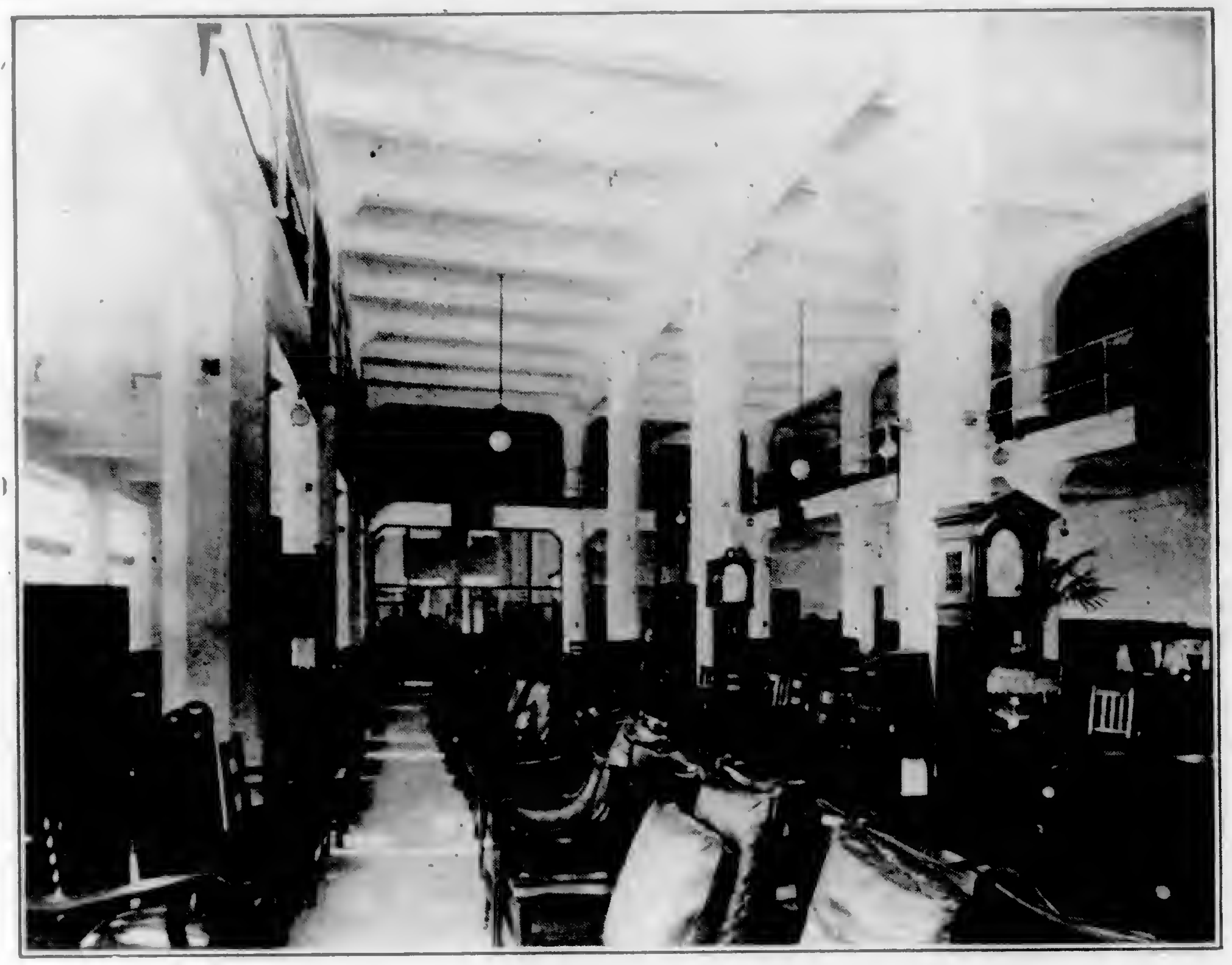

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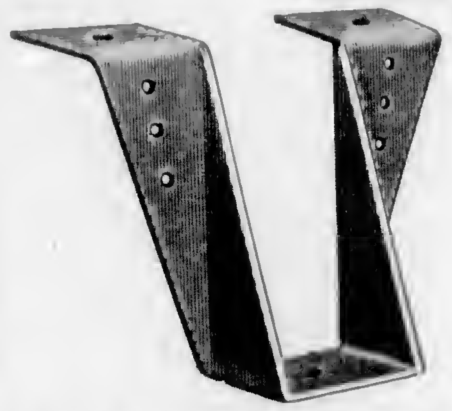

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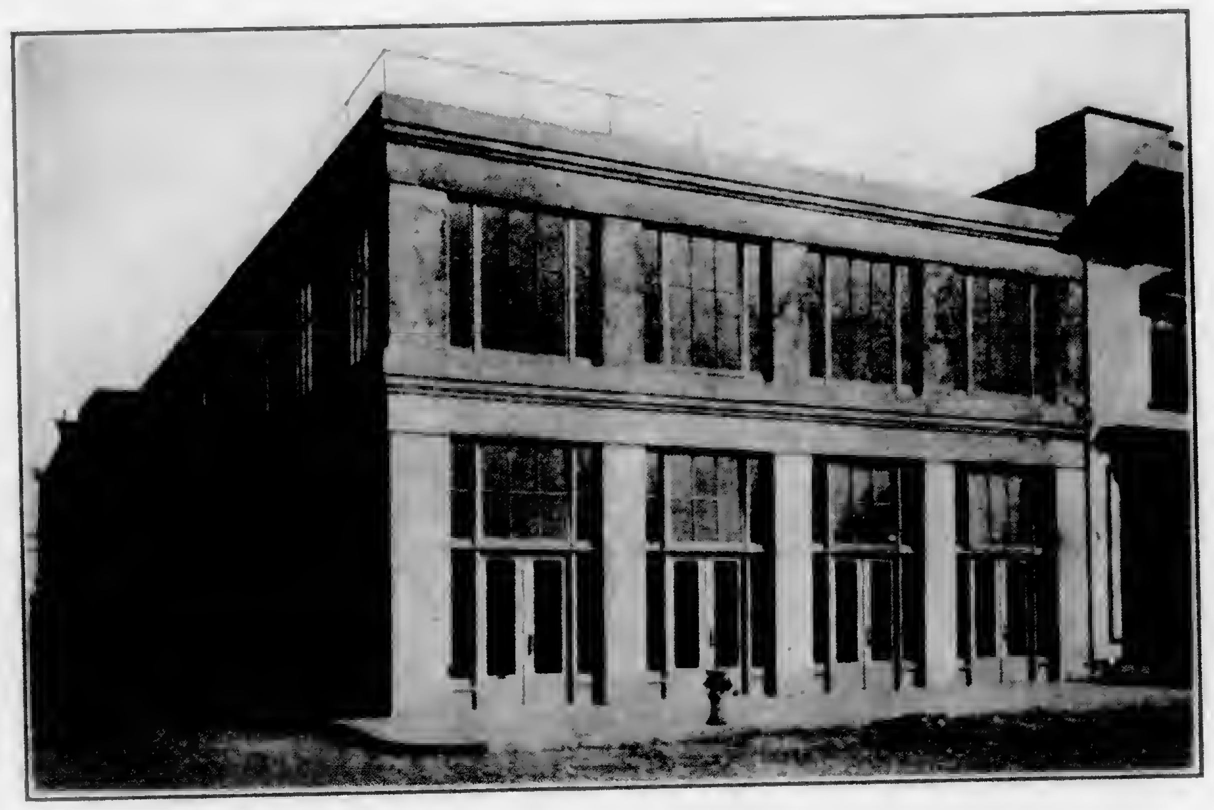

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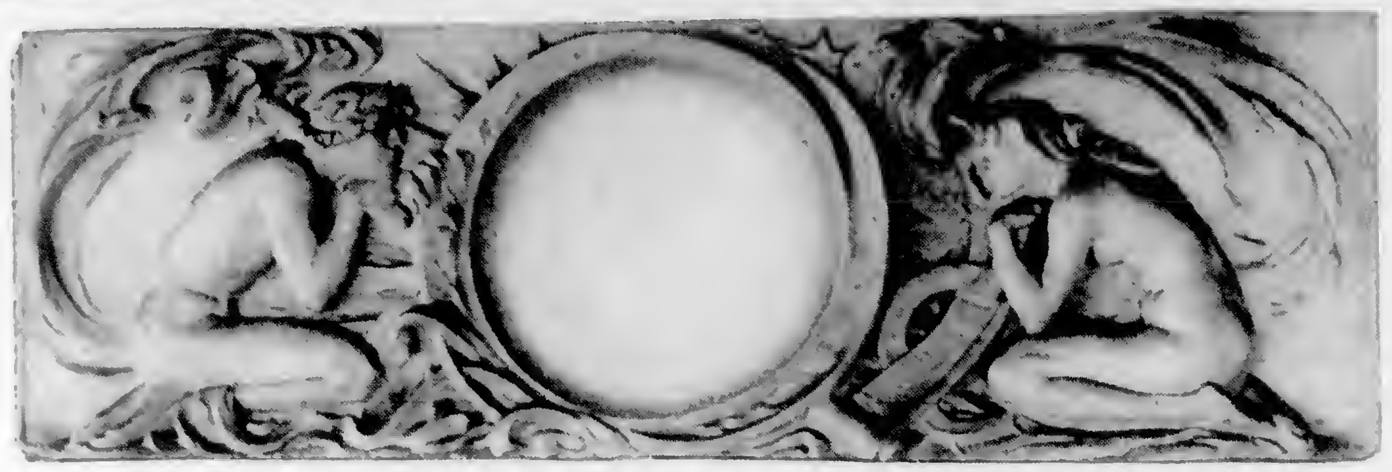

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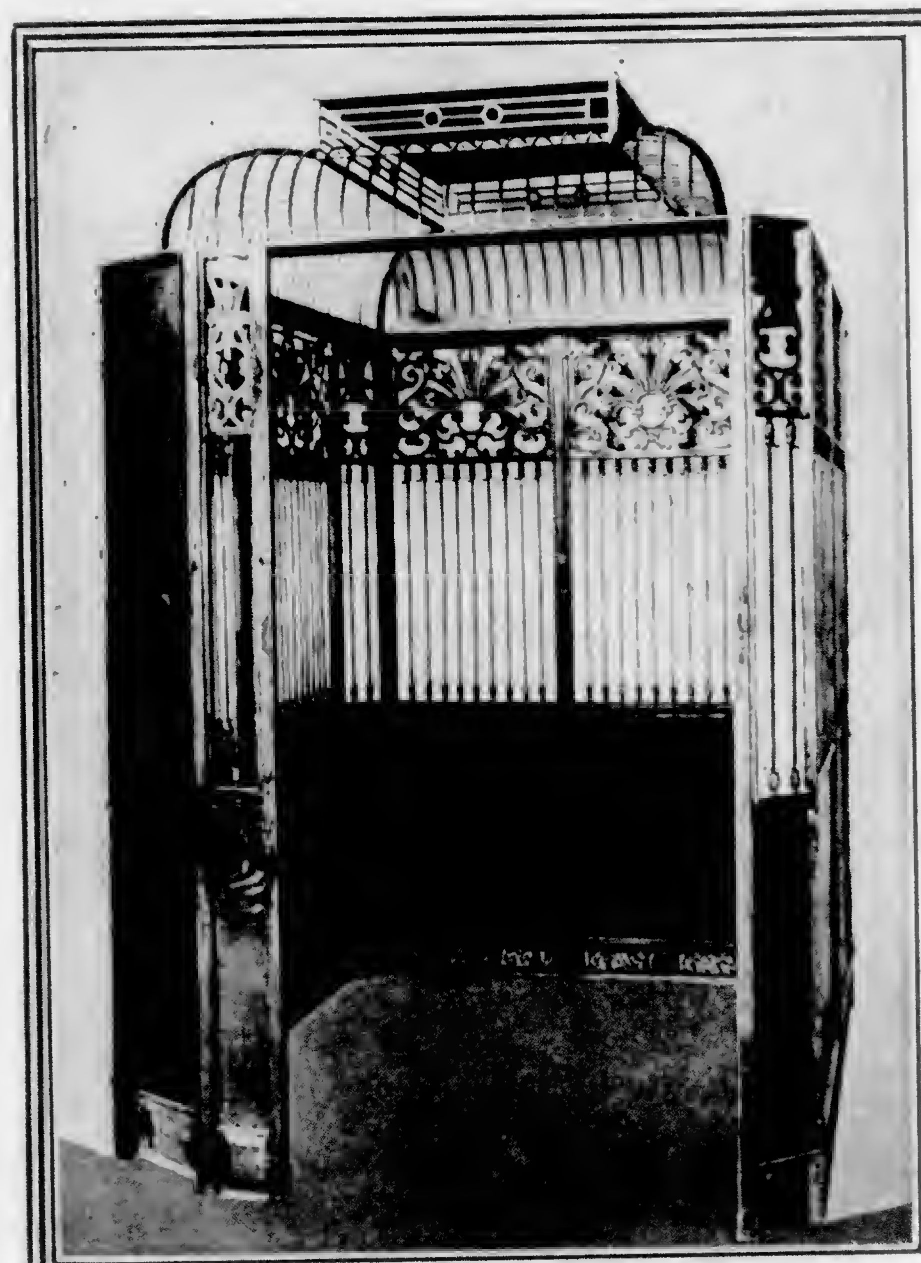

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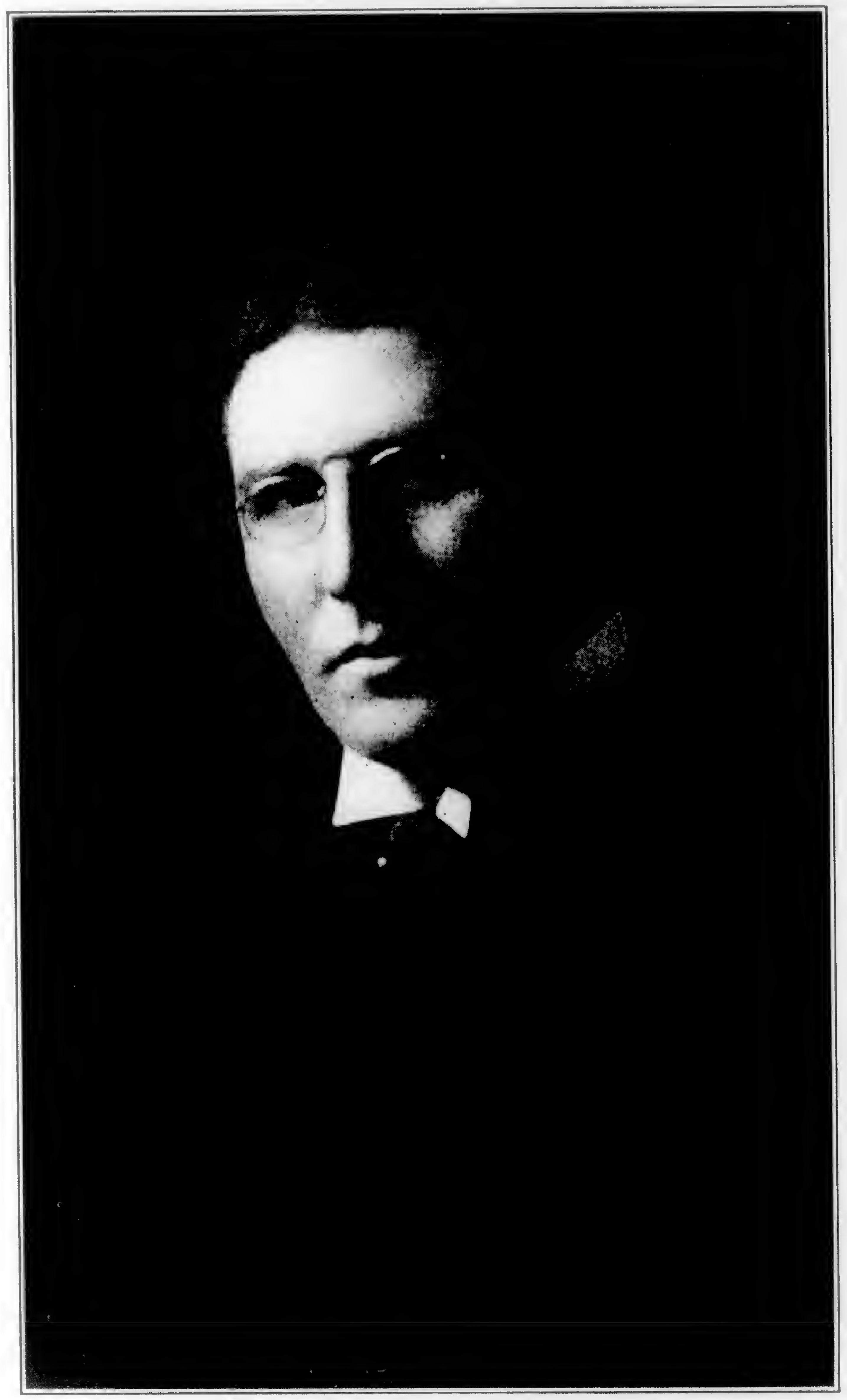

CLARENCE R. WARD, Architect

Member of the California State Board of Architecture.
Vice Henry A. Schulze, Term Expired

Frontispiece
The Architect and Engineer of California
August, 1908

THE
Architect and Engineer
Of California
Pacific Coast States

VOL. XIV. AUGUST, 1908. No. 1.

San Francisco Leads the World in "Class A" Buildings

By CLARENCE R. WARD, Architect.*

ALTHOUGH I have spent several years of my life in the Eastern and Southern States, and have made several trips to those parts since that period, to me such a trip is a never ending source of interest.

It has been said that there is nothing new under the sun. Architecturally speaking, there is always something new from sun to sun. Locality and conditions largely govern these matters, and what may be an old story to us is a new thing to those at a distance from us. For instance in the matter of foundation work, conditions of varying soil, water pressure and other important things, which confront us here, are entirely at variance with conditions in New York, Chicago and other important cities. Here we have quicksand, tide water, earth vibration and other conditions to meet, and these may be entirely different one from the other within the space of one of our city's squares.

In the East foundation conditions are practically the same for all buildings in their respective localities, and conditions are not nearly as bad as ours at that, which is one reason why buildings may be erected to such prodigious heights there. In Chicago for the larger structures the old so-called "floating" foundation has given way first to the caisson work driven to hard pan, and this in turn superseded by the same driven to bed

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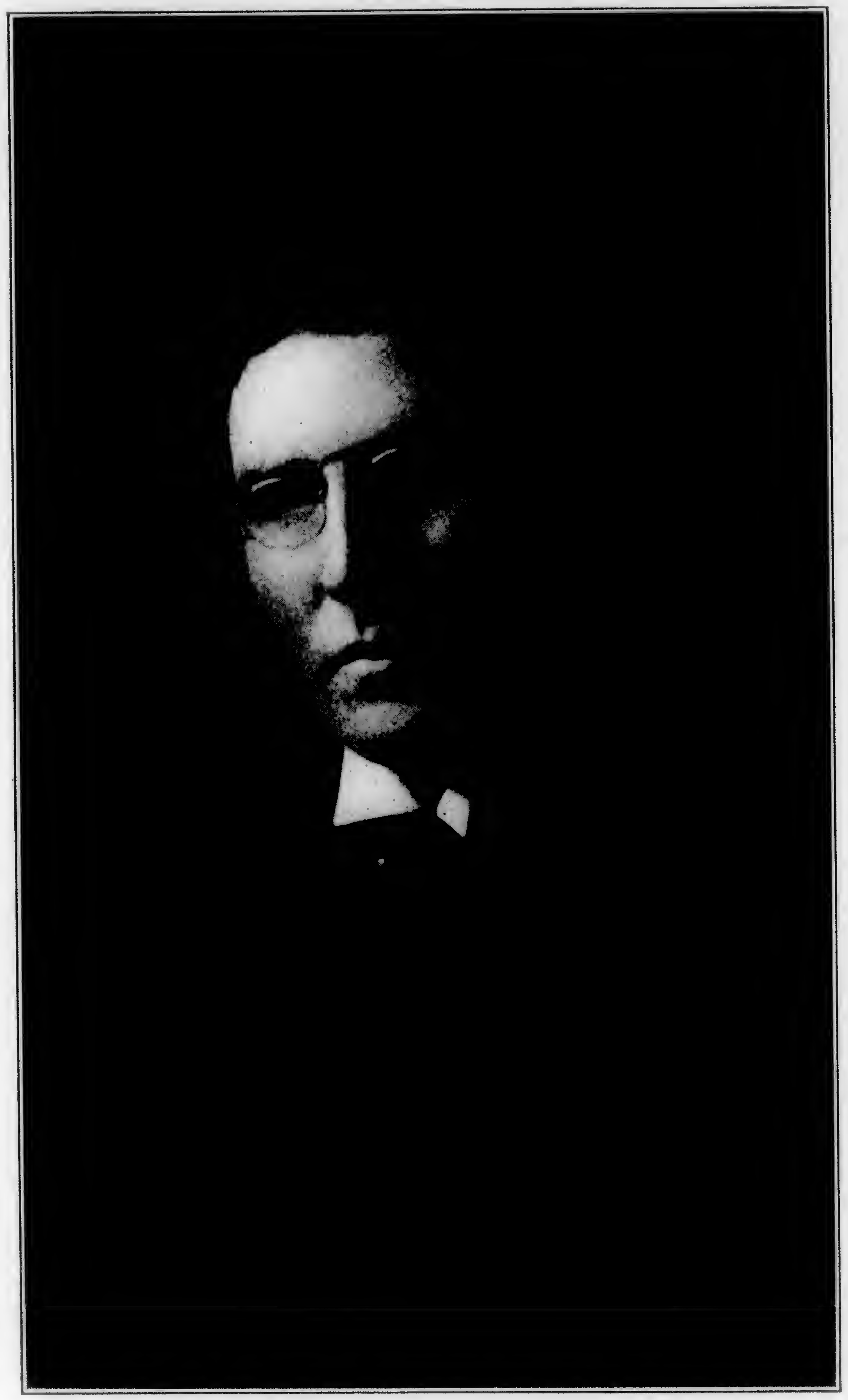
*Clarence R. Ward, the newly appointed member of the California State Board of Architecture, succeeding Henry A. Schulze, term expired, was born in Niles, Michigan, December 19th, 1870. He began the study of architecture in 1884 and continued for two years in various technical schools in San Francisco. He finished with a special architectural course of four years at the California Military Academy in Oakland, during which time the study of architecture was constantly continued in architects' offices in Oakland.

Mr. Ward removed to the East in 1890 and was associated with the best Eastern and Southern architects for some five years. Upon his return to San Francisco he was employed for a number of years with Frank T. Shea and others. Afterwards Mr. Ward became associated with the City Architect's office and later assumed charge of the office of Edward R. Swain, architect of the Ferry building.

In the early part of 1904 Mr. Ward formed a co-partnership with Henry H. Meyers, successor to G. W. Percy. Since the fire, as a member of the firm of Meyers and Ward, he has been architect of many notable buildings, among them the Alaska Commercial building, Wells-Fargo, Hyman Estate, Hahnemann Hospital, Methodist book concern and many others.



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In the East foundation conditions are practically the same for all buildings in their respective localities, and conditions are not nearly as bad as ours at that, which is one reason why buildings may be erected to such prodigious heights there. In Chicago for the larger structures the old so-called "floating" foundation has given way first to the caisson work driven to hard pan, and this in turn superseded by the same driven to bed rock. The foundation for an eighteen story Chicago building, which I recently examined, consisted of concrete caissons piers ranging from six to ten feet in diameter and from one hundred and fifty to one hundred and seventy-five feet in depth. I found, however, that at this point water pressure and quicksand were not as bad as ours at a depth of from twenty-five to thirty feet below that grade.

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In New York they excavate to solid rock, to which they anchor their foundations, and then build to any height fancy may dictate. I do not mean to infer that their architects, engineers and contractors are without knotty problems to solve. That they have such problems and solve them with great skill is proven by their work which speaks for itself. However, building for building, ours compare most favorably with theirs, and in this statement I am borne out by some of the most eminent architects and builders in the East. I have been told, and from observation believe it to be true, that we have here more "Class A" buildings in proportion to the population than any other city in the country.

One interesting feature to me was the architectural design of their shop windows. Such great stores as Marshall Field's and others in Chicago and Altmann's, McCreery's and their like in New York have, in common with many small stores, their windows flanked with massive metal or stone piers, which lend an appearance of solidity to the architectural facade of the buildings, and at the same time form a frame, as it were, to the picture, which consists of their rich goods simply and artistically displayed. In San Francisco the tendency of some seems to be to get as much glass in front and as much goods behind as is possible with the inevitable result that a number of our buildings, otherwise well designed, look as if perched on plate glass foundations.

Eastern people seem much interested in us and our welfare, and I have been assured by people prominent in the financial world that they greatly admire our grit and what we have accomplished, and that they are looking forward to profitable investment here in the near future, or as soon as the financial depression has passed. In the face of the great crops I saw everywhere and the optimistic air of the people whom I met, I fail to understand the reason for the financial depression. It seems almost as if we were "enjoying" depression by common consent. Everything, however, both East and West, seems to be looking up, and I am glad to be at home again and at work.

* * *

Brick Leads for Street Paving

An interesting investigation was recently made by the Municipal Journal to ascertain the relative use of various materials utilized for paving city streets throughout the United States. The results of the inquiries show that, during 1907, brick led the entire list in all sections except New England, where stone block and gravel found more general use. In the Middle Atlantic states asphalt occupied second place, and in the South Atlantic states bitulithic pavement stood second. In the Ohio Valley district brick constituted more than 80 per cent of the material used, and it is estimated that in 1908 it will constitute fully 90 per cent. In the estimate for 1908 it appears that asphalt will take first place in the Middle Atlantic states and stone block in the South Atlantic states, but brick will continue to be the favorite in the Ohio Valley and Mississippi Valley states. In the Rocky Mountain district and on the Pacific Coast asphalt leads all other paving material.

DAVIS SCHONWASSER COMPANY

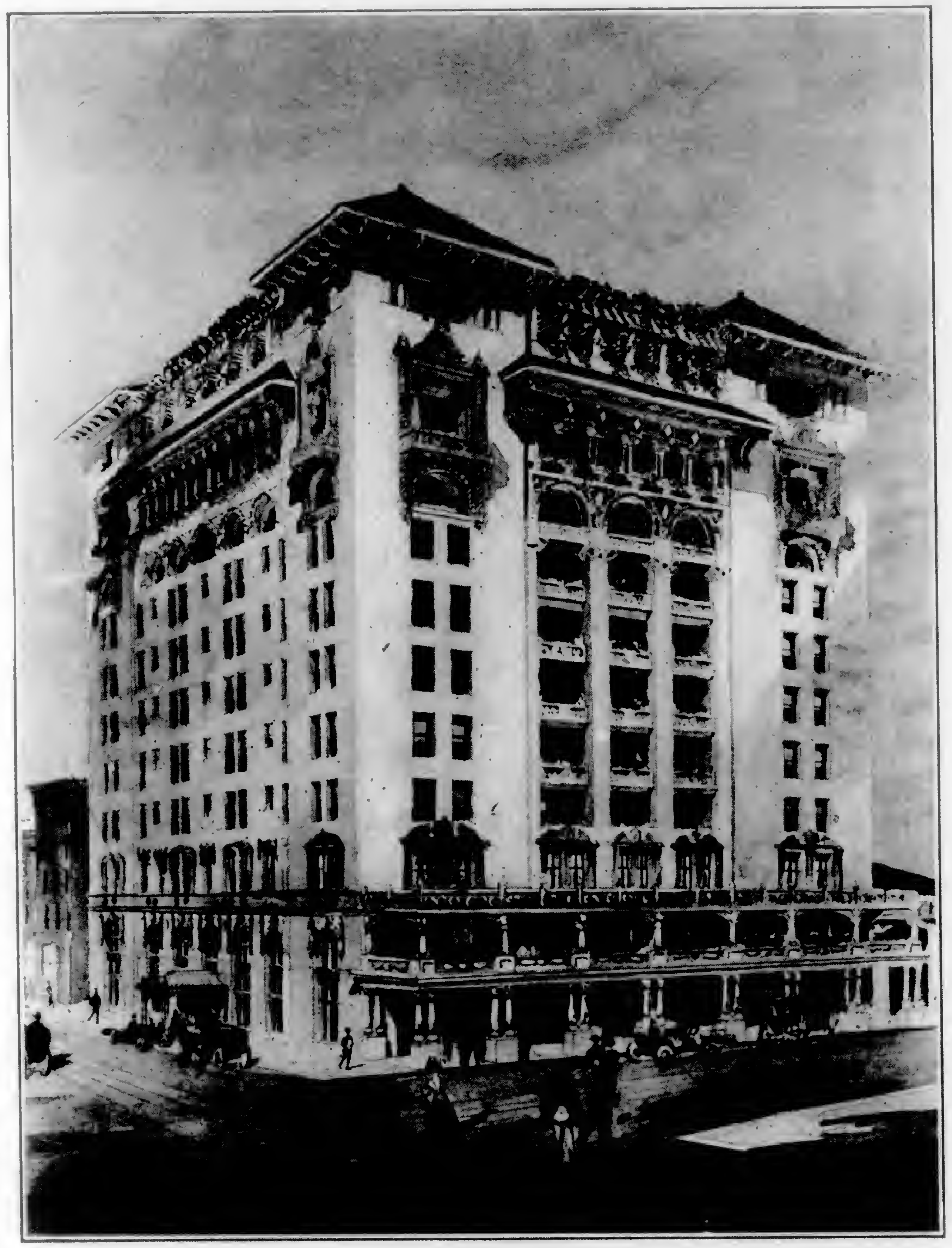
Davis, Schonwasser Building, San Francisco
Equipped with Otis Elevators
MacDonald & Applegarth, Architects

Art and Commercialism in Architecture

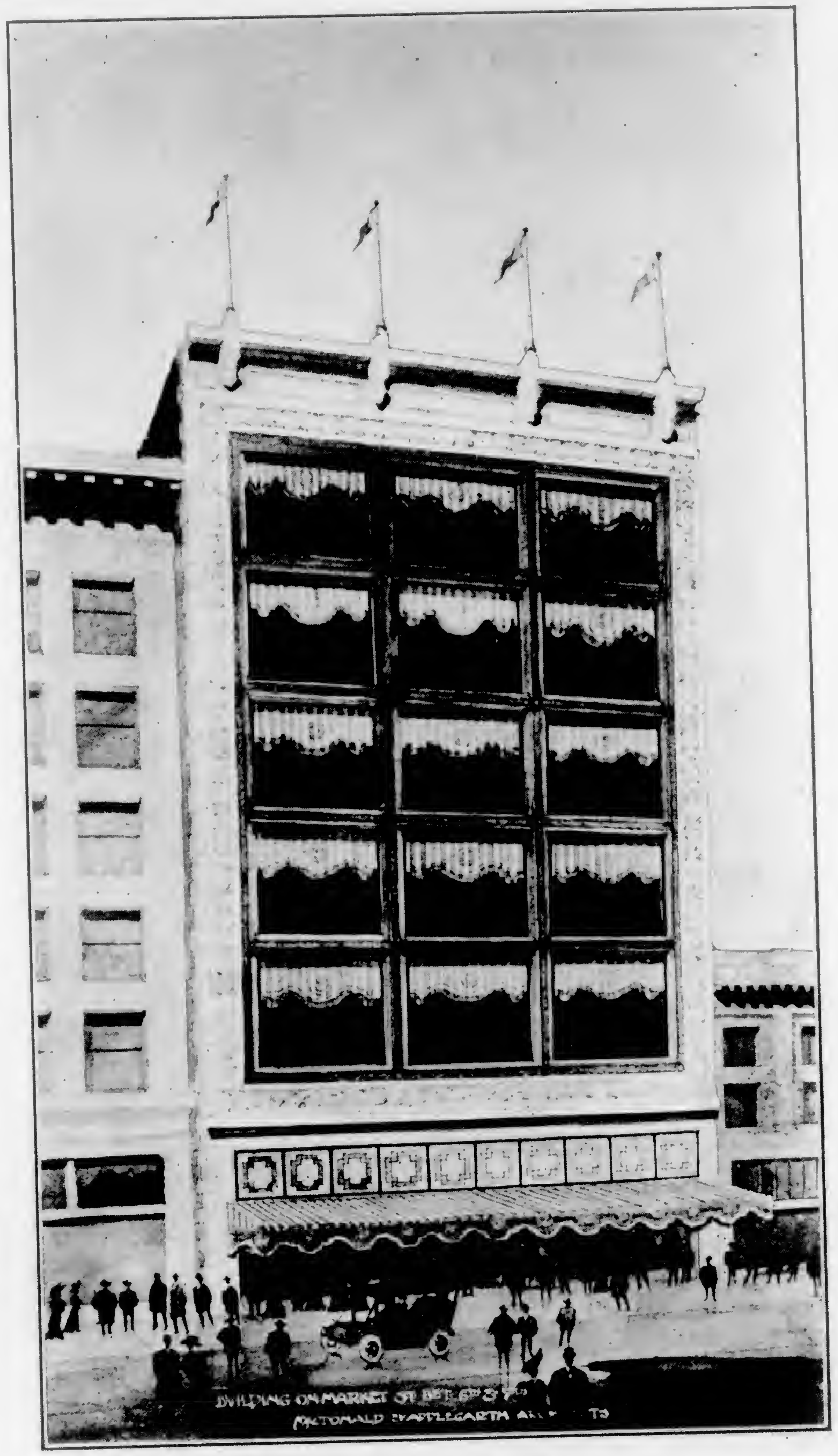
By KENNETH MACDONALD, JR., Architect

LOOK backward for a few moments among the pages of architectural history to, we will say, the twelfth century, when the cathedral of Notre Dame was being constructed, and think of the sentiment and love of the beautiful which made its designers as well as each individual workman sharpen his pencil or his chisel with the firm conviction that every effort toward making the edifice a thing of beauty would gain its reward in the after-world. Think of the grotesques which were made to smile or to frown as the mood of the carver prompted. Each tried to surpass the other in his endeavor to do the best piece of work. Without the use of drawings in detail, and with a constant demand upon their ingenuity they labored and strove to accomplish a work of art. Such was the feeling which existed throughout the Latin races making the architecture of France, Italy and Spain what it is today, a precedent for all others to follow, when the opportunity arrives for them to do an artistic thing.

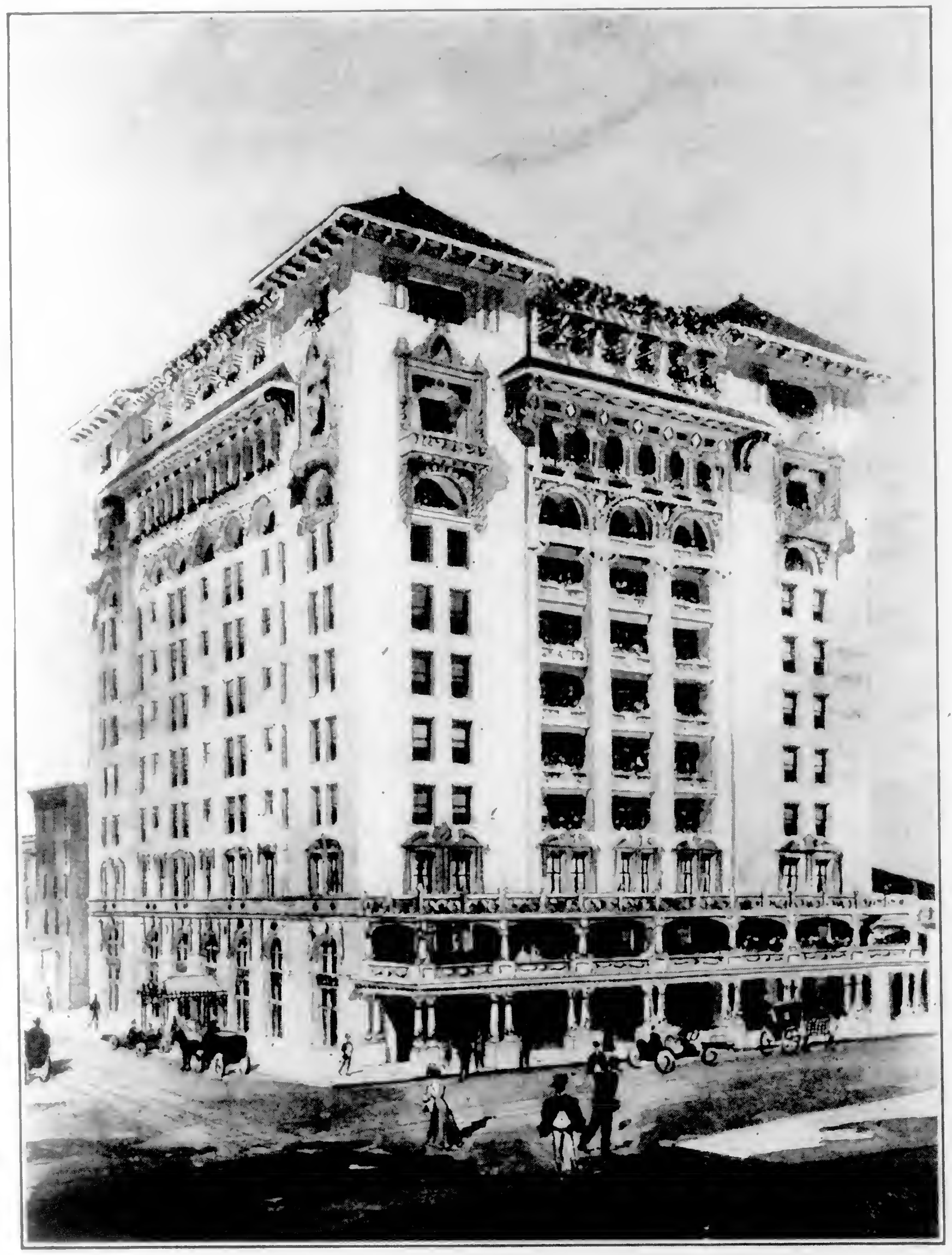
Let your thoughts recall the picturesque ruins of the Forum in Rome, where we can detect even among the shattered pieces, the great simple proportion and rugged honesty of those columns which were designed to carry weight by the true strength of the material of which they were made without depending upon a core of steel for stability.



Design for a Hotel
MacDonald & Applegarth, Architects


BUILDING ON MARKET ST BET 6th & 7th
MACDONALD & APPLEGARTH ARCHITECTS

Forrest Building, San Francisco
Equipped with Otis Elevators
MacDonald & Applegarth, Architects



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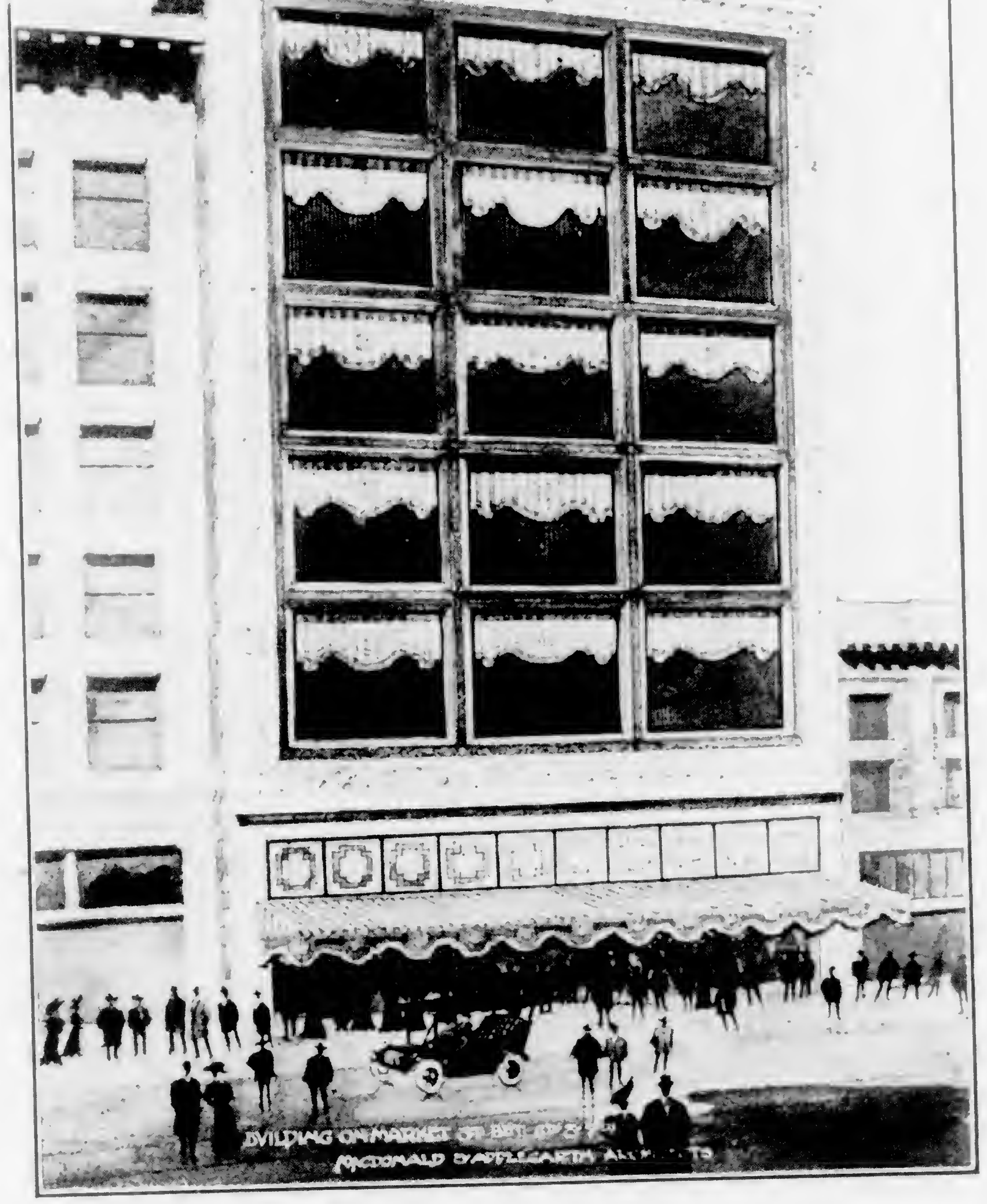

BUILDING ON MARKET ST BET.
MACDONALD & APPLEGARTH

Forrest Building, San Francisco
Equipped with Otis Elevators *MacDonald & Applegarth, Architects*

What a sudden and disappointing revelation it is to bring the focus of one's eyes within the boundaries of our own commercially ridden country, where we are forced to imitate, always to imitate. Seldom or never is there a building constructed which does not imitate masonry by a false veneer of masonry forms, depending almost entirely upon a stronger space-giving skeleton of steel, which is necessary, to carry the lofty superstructure of a commercial building.

How often do we find a key stone which would not remain anchored to the frame within, even after the thrusts of the neighboring stones, as well as the stones themselves, have been taken away? Our universities, as well as the more advanced Ecole de Beaux Arts, laboriously trains us to imitate, never to build truthfully and sincerely of the material in hand.

A great many would say that this is on account of the fact that the skill of the engineer has surpassed the development of architecture. That the architecture is good in so far as it is satisfies the eye by virtue of what it is accustomed to.

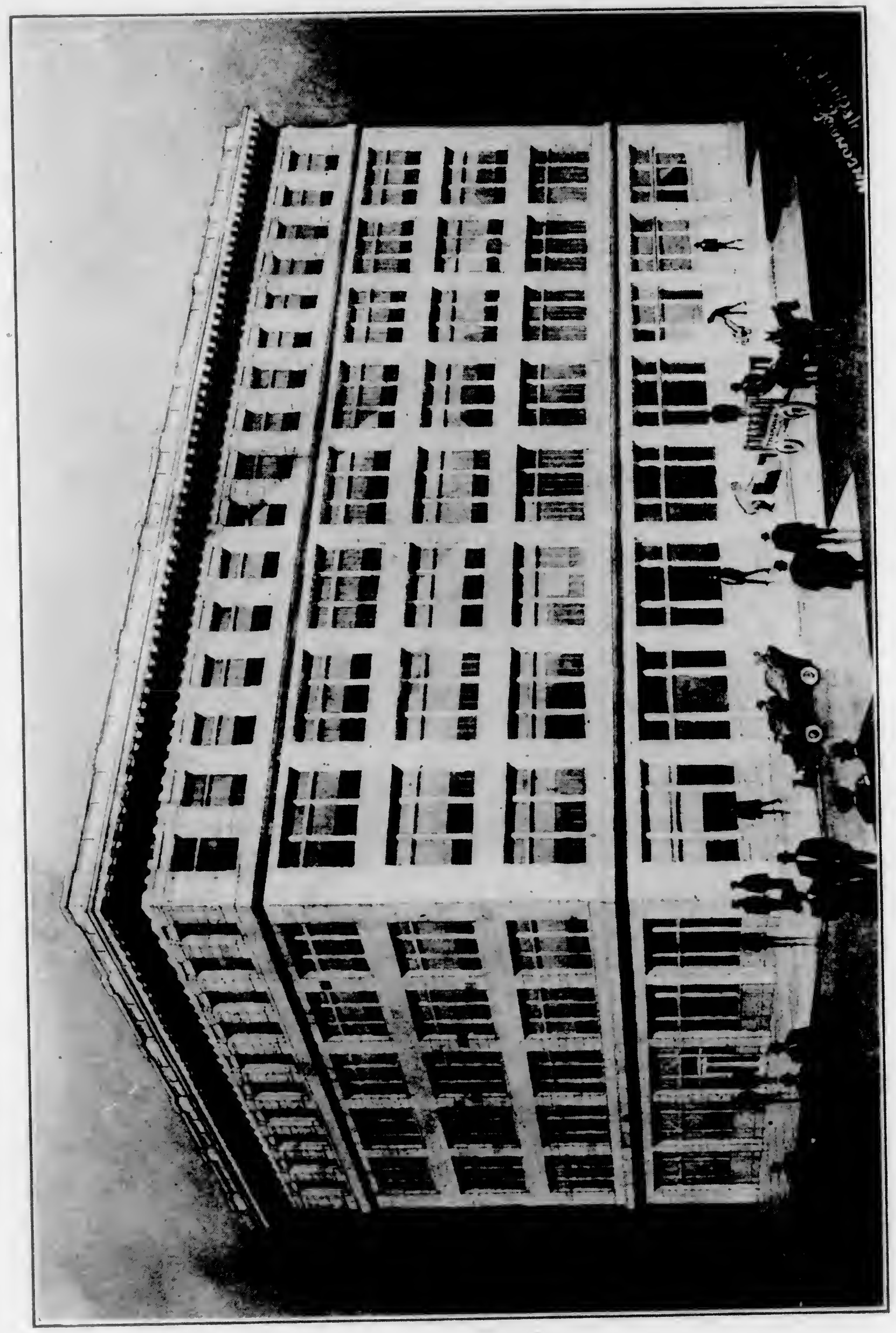
It seems that if Americans had never seen the European works of art, had never been able to travel and to adopt the structural forms of a bygone age they would possibly have been compelled to create an entirely characteristic architecture of their own. That the skyscraper of today would look like a strong, bold demonstration of an engineering feat clothed in light delicate ornament, which would harmoniously reconcile art and force into a unit without disguise or artificiality.

The cornice of today owes its existence entirely to the fact that the human eye is so accustomed to it that it cannot be satisfied without it. It usually is anchored on to a fire wall which rises several feet above the roof and prevents its use as a drain for the roof water, for which the cymacium was originally intended. The modillion, which archaeology tells us is the development of the ends of the roof timbers, extends only its visible length to the wall and is not infrequently made of copper or galvanized iron. Is it the fault of the layman that architecture has become so narrow or is it the fault of the architect, who could if he wanted to, by studied and gradual change lead and accustom the eye of the people to a truer and more sincere solution of the problems which they give him to do?

It seems that there will eventually be two distinct types of architects. The first will be the designer of the picturesque, where art reigns supreme, squeezing out in a large measure the thought of the investment. His class of work would naturally embrace ecclesiastical, monumental and domestic architecture. The second type would be the business man's architect, who could appreciate the merit of the investment, who could first of all design the building with a clear understanding of its renting value per square foot, proportioning its cost per cubic foot largely upon this basis—a man who could see the necessity of light and open the building to the sun. A man who could study a plan for an office building with the clear understanding that every square foot of corridor space saved would give a foot of rent producing surface to his client.

This will eventually confine the commercial building to a study of texture rather than form, and in spite of its apparent limits will always give its designer the opportunity to use his taste in refined uses of color and form.

We have come to a period of commercialism and if we wish to do commercial architecture there is only one way to do it and that is to keep before our eyes the fact that the man who puts up a building as an inves-



Tillmann & Bendel Building, San Francisco MacDonald & Applegarth, Architects

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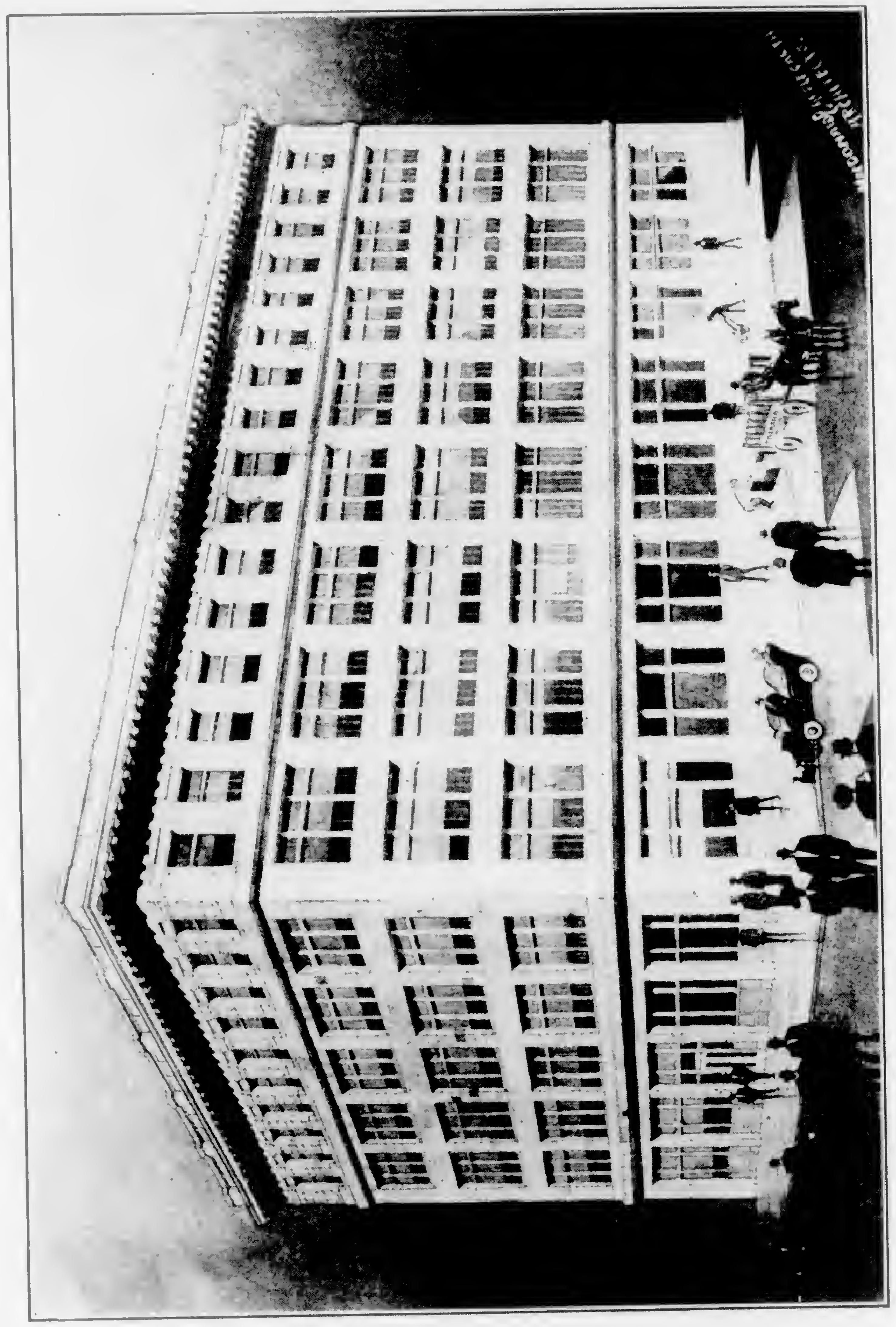

MacDonald & Applegarth, Architects

Tillmann & Bendel Building, San Francisco

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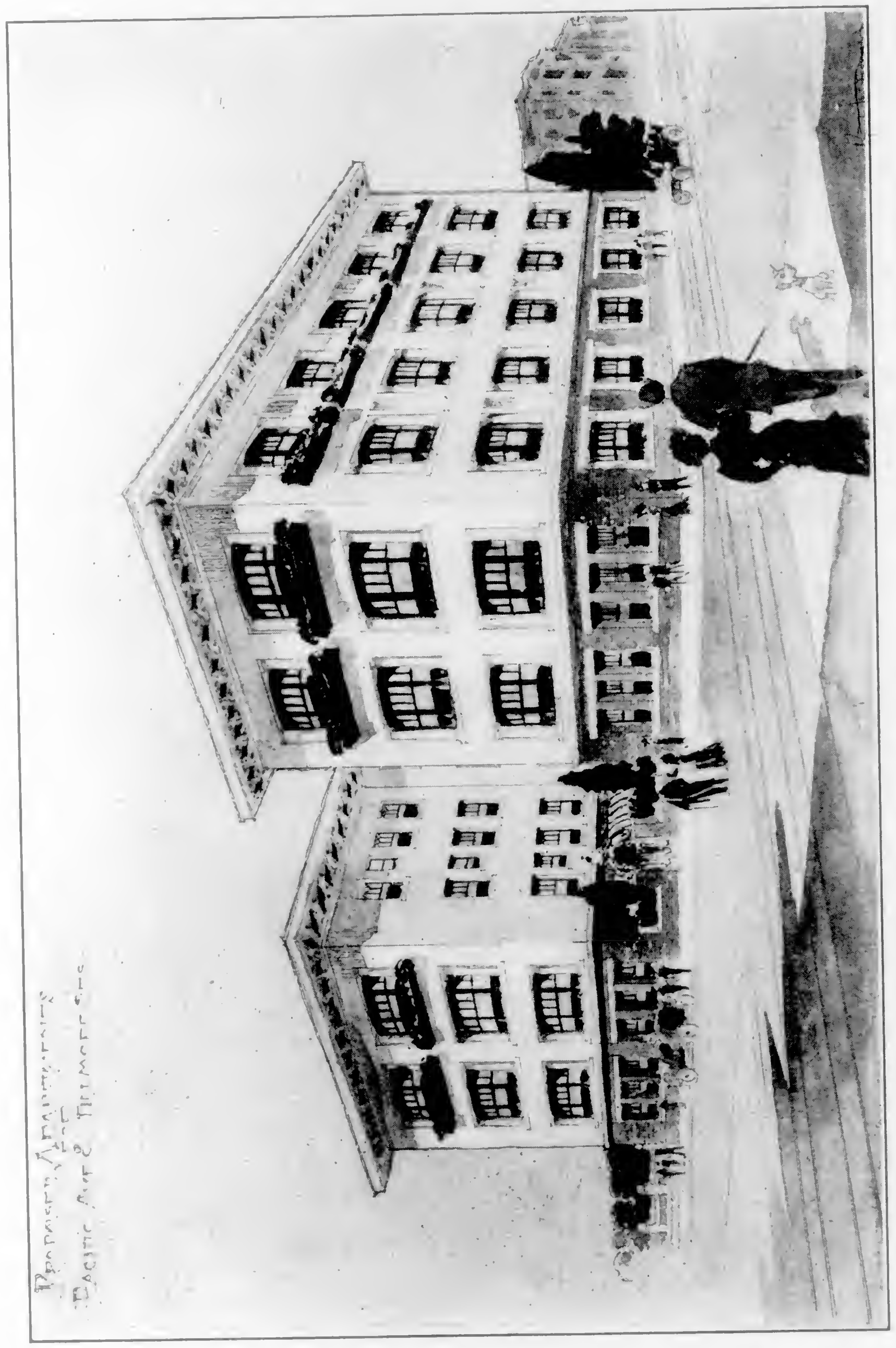


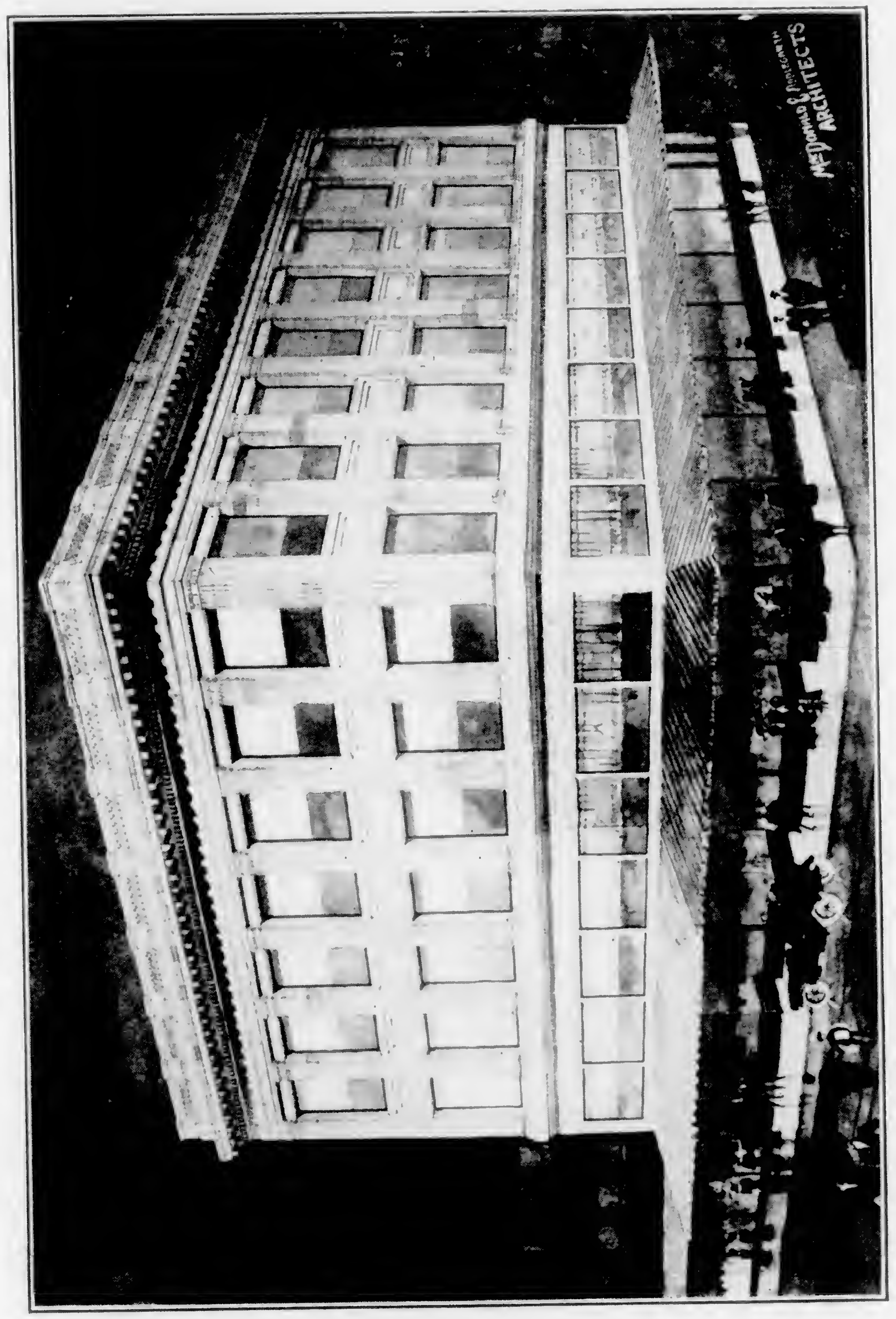
Design for an Apartment House, San Francisco
MacDonald & Applegarth, Architects

GEO. A. MOSS
GLOVE HOUSE
BUILDING

San Francisco

MacDonald &
Applegarth
Architects

*Equipped with
Otis Elevators.*


McDONALD & APPLEGARTH
ARCHITECTS

ment wants the greatest possible revenue from it. That it is by no means the most elaborate building which commands the highest rent but the building which is designed with a good supply of light, and a good mechanical equipment. Such a building with a simple and tasteful facade will be a monument to its designer in the eyes of every business man who knows that it is a good investment.

* * *

The Kaiser as an Architect

EMPEROR WILLIAM is the busiest man in Germany. Temperamentally, I take it, President Roosevelt resembles him much, but the Kaiser is the more versatile of the two. If there is anything going on in the empire that the Kaiser does not find an opportunity to take a hack at, it has escaped the notice of those who watch him closely. He revises all public findings, supervises all architecture, lectures everybody, and is a general all-round little Father in every sense of the term.

When they want to illustrate his ceaseless activity, as well as resistless power, they tell the story of the star above the cross on the spire of the Emperor William Memorial Church. This is the tale as it was told to me: Of course, the Kaiser insisted on revising the plans of the church. That is one of his fondest prerogatives—revising everything, and especially plans. The architect brought the plans to him, and the Kaiser scratched out what he didn't like and made such additions as he fancied before he gave them the imperial O. K. The church was built. There was to be a big gilt cross on the spire, and it appeared in its proper place. But, much to the general astonishment when the cross was put up, a large many pointed gold star was raised above it on a heavy rod. The Berliners could not understand the star. They inquired. The architect said the Kaiser had added the star to the plans.

The plans were examined. Then it was found in revising them, the Kaiser had let fall a drop of ink from his pen which hit the paper just above the cross. The architect studied a long time over this blot of ink. His Teutonic mind grappled with the problem for weeks. There was no appeal. There could be no inquiries. He finally decided the blot of ink signified a star above the cross, and he put the star there, making it correspond as near as possible with the outlines of the blot. The star is still there.—Samuel G. Blythe, in the June Everybody's.

* * *

A Business Move

"Of course," said the shrewd business man, "I don't want to be sick, but it looks as if I'd have to call in Dr. Borroughs for a couple of weeks."

"Why, what's the trouble?" asked his friend.

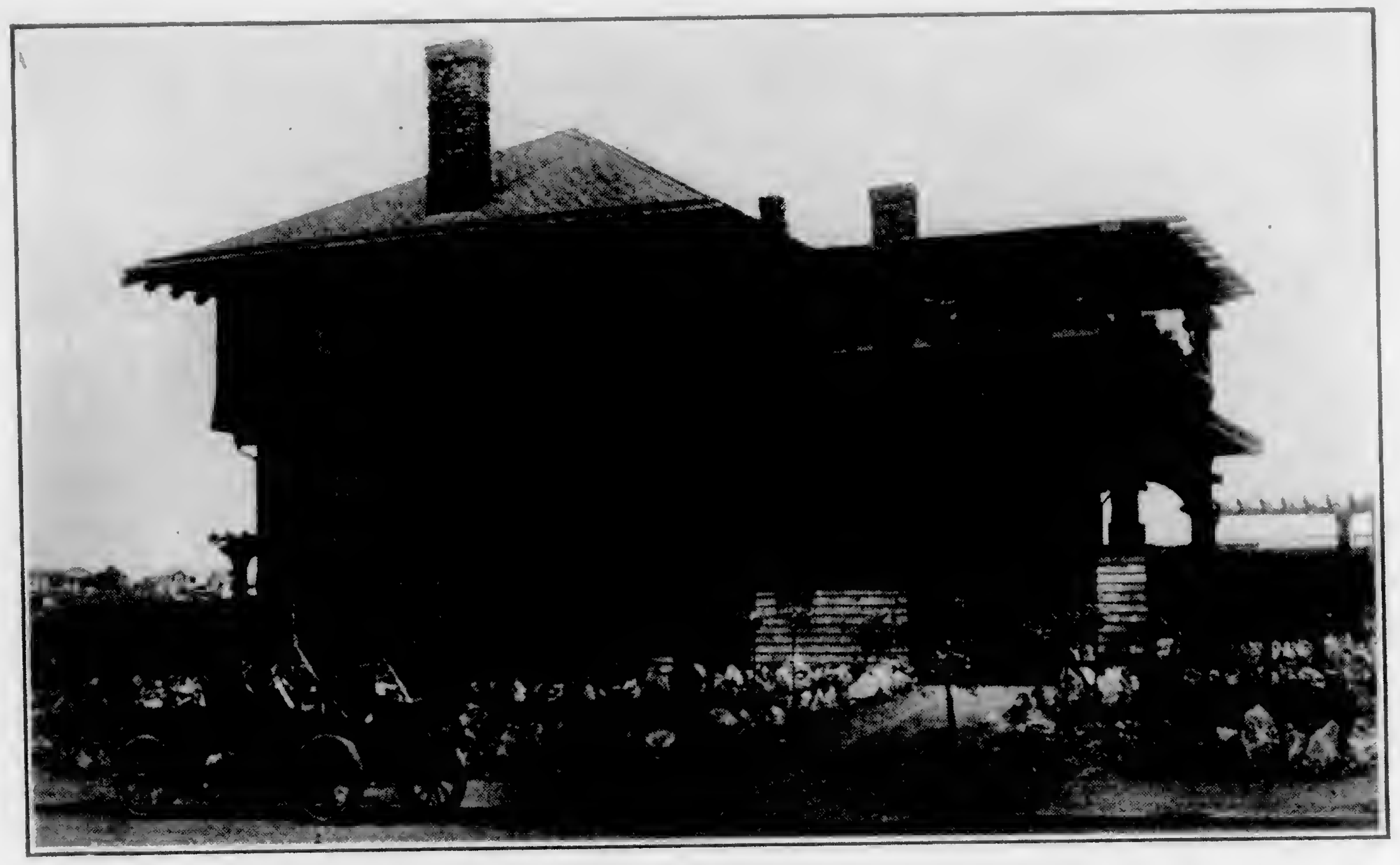
"He owes me $100, and that's about the only way I can collect it."—Philadelphia Press.

* * *

Honesty is the single quality that exceeds the value of personality in business life.

* * *

Though there may be no present to appreciate and no future to hope for, thank God there is a past to be remembered.



Bungalow of Mr. Gilbert H. Cunningham, Oakland
A. W. Smith, Architect

An Attractive Oakland Bungalow

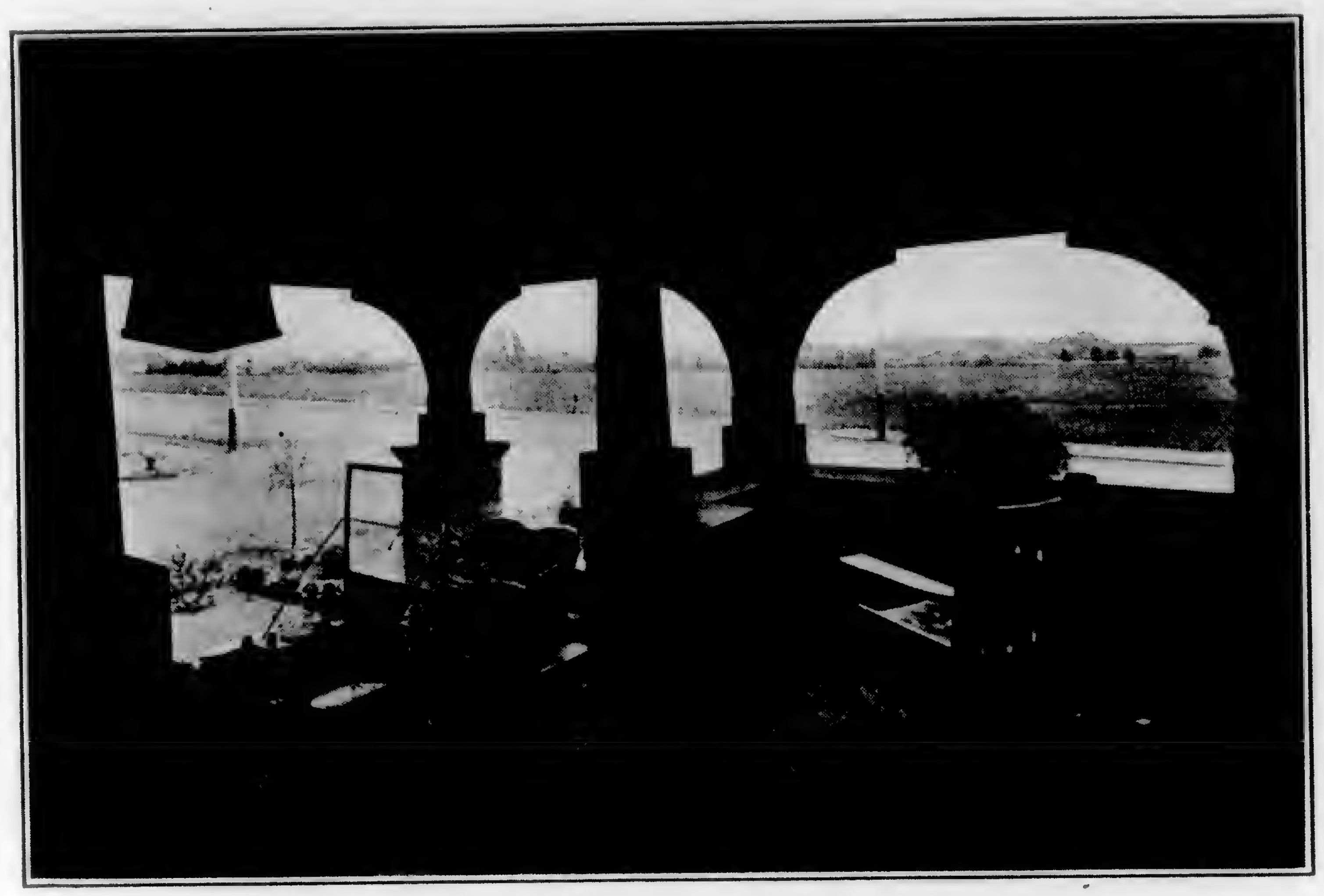
By A. W. SMITH, Architect

AMONG the new houses built in Oakland probably none has received more favorable criticism than the house of Mr. Gilbert H. Cunningham, on the Alameda county scenic boulevard. Mr. Cunningham is the president and manager of the Builders' Supply Company of San Francisco.

The illustrations shown herewith are of a large, two-story bungalow, arranged to get all the sun possible inside of its shingled walls. On the east side is a great porch and porte cochere with an immense pergola sun porch for the second story.

The interior is finished in brown stained wood in heavy Mission detail, so heavy and unique in form and design as to create an atmosphere of rest and comfort that ordinarily comes from the antique timbering of some old Spanish castle. In carrying out this effect the hall and living room were paneled with calf hides with the hair left on them, the soft multi-colors blending well with the brown woodwork, leathered walls and arched ceiling. The dining room, to carry out the same idea, has penelling of gold-bronze Spanish leather, while the ceiling, which slopes upward from all sides to the center, is covered with Japanese bronze burlap. On the stair landing there are some large windows which have been filled with art glass in a design representing the bottom of the sea and in which are great red and speckled fish floating lazily about.

Underneath this stair landing Mr. Cunningham has a den or profanity room, so called because no one is allowed to use severe adjectives in any other part of the house. This room has panelled walls and ceilings and all woodwork is fastened with rough black-headed nails. In this room is a writing desk built in and arranged to accommodate several bottles of ink, and whenever his friends call on him Mr. Cunningham invariably tenders them a glassful of red or amber-colored ink, so they can write down in their memory his invitation to call again and call often.



*Bungalow of Mr. Gilbert H. Cunningham, Oakland
A. W. Smith, Architect*

The billiard room is another unique room. It is panelled in wood with heavy beam ceiling and great timbers as casings around the doors and windows, with a huge timber all around as a panel cap and heavy square timbers as battens on the panelling.

When it came to selecting the wall coverings, nearly every paper store in California was inspected in an effort to procure something different in decorative effects. The living room walls have a marine covering. On the hall walls is a brown leather with the caravels of Columbus embossed thereon and a ceiling of a bronze-gold burlap. In every room where paper is used there is harmony and luxury combined—from the delicate lacey flower-strewn bedroom wall to the Dutch kindergarten motto-covered paper in the small children's room. The fireplaces are iron bound and of clinker brick and will take a log. The living room has a great raised hearth of dark red Welsh tile, which makes one want to sit in one of the massive leather-cushioned oak chairs and rest his feet on the tile and dream pictures with eyes half closed, for it is all so different from what one sees elsewhere.

*Living Room, Bungalow of Mr. Gilbert H. Cunningham, Oakland
A. W. Smith, Architect*

*Hall, Bungalow of Mr. Gilbert H. Cunningham, Oakland
A. W. Smith, Architect*

The Furnishings of the Library

THE library exists because of books. Its function is to store books safely, display them agreeably, and afford opportunity to consult them conveniently. Furniture, woodwork, and decoration should be selected with this in mind.

Libraries should possess an air of learning. But this does not necessarily impose a sense of dulness or a lack of comfort. Cheerfulness and dignity should go hand in hand, and in the ordinary library there is no occasion for dulness. It is a mistake to suppose that books demand an austere environment.

The three graces—comfort, dignity, cheerfulness—can easily be combined. The books and the bookcases are the principal decorations of the room. For warmth of color, a sense of restfulness and comfort, and a subtle suggestion of intellectual enjoyment, there is nothing to equal well filled book shelves.

The arrangement of the book shelves is of utmost importance. They should be simple, and in no way detract from the books. The

*Dining Room, Bungalow of Mr. Gilbert H. Cunningham, Oakland
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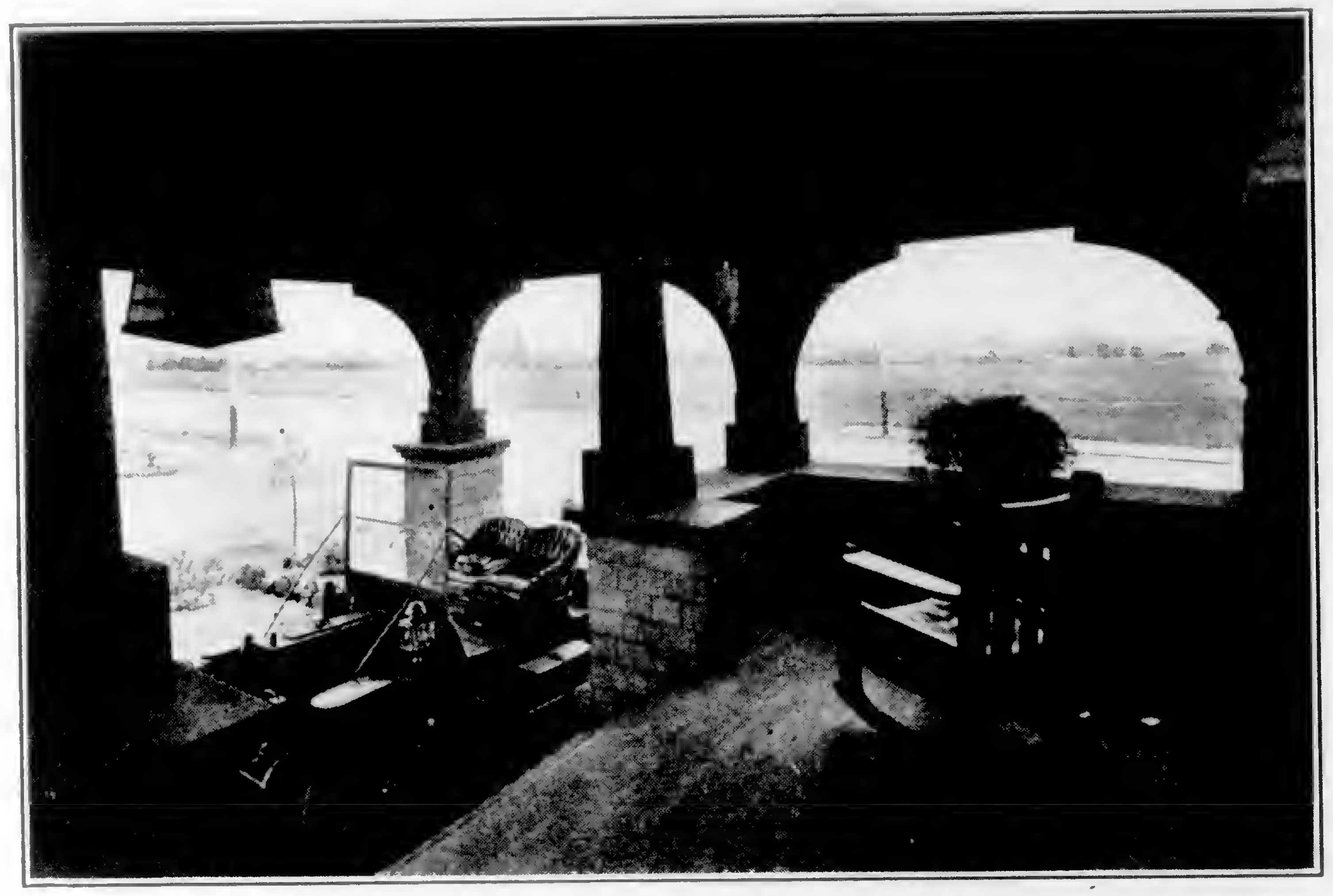

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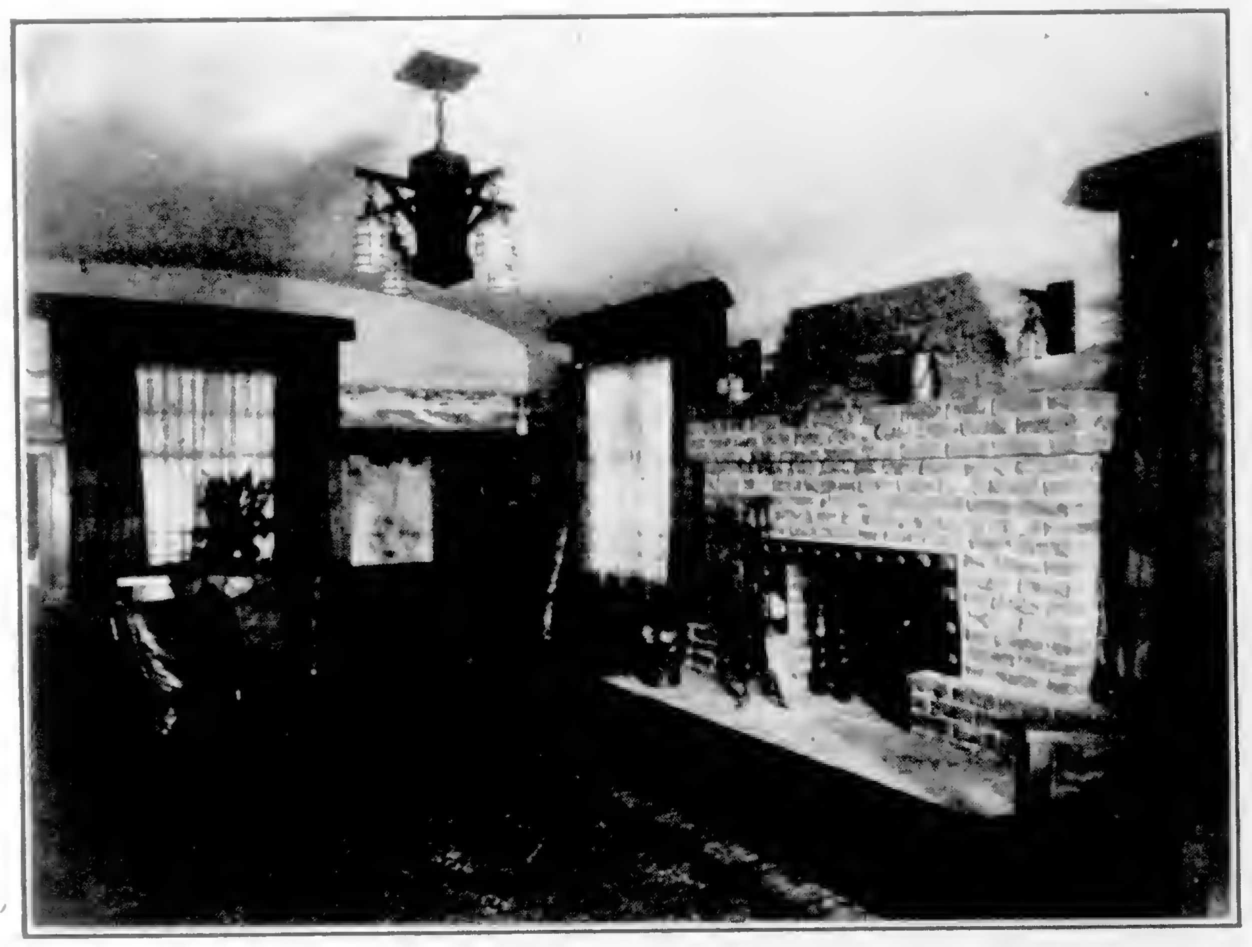

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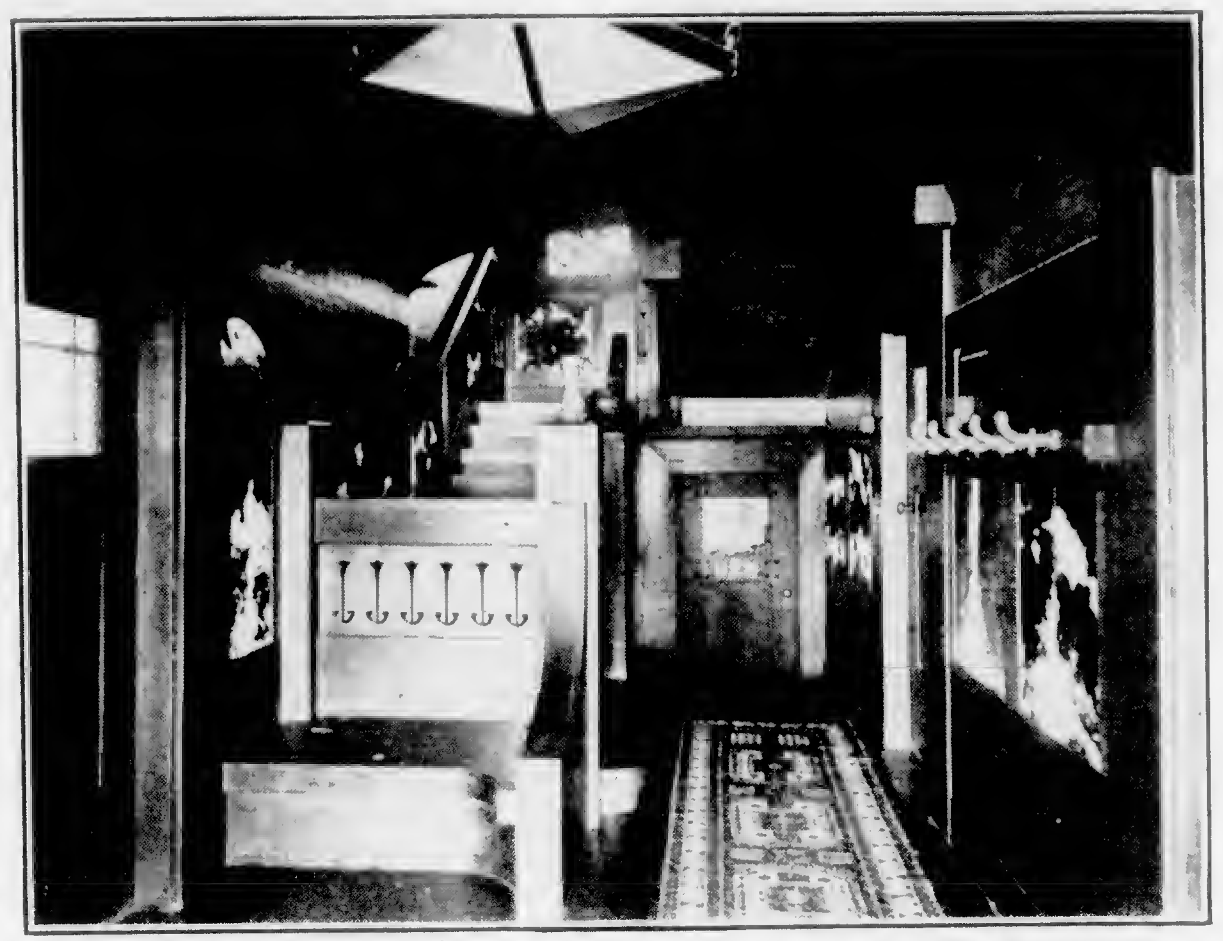

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The arrangement of the book shelves is of utmost importance. They should be simple, and in no way detract from the books. The

Dining Room, Bungalow of Mr. Gilbert H. Cunningham, Oakland A. W. Smith, Architect unit system of shelving is a decorative and expedient method for showing books. The shelves increase as the books increase, without the aid of the carpenter, and sectional bookcases are made in a variety of styles and finishes, and can be adapted to almost any decorative scheme.

Among the appointments of a home library, a desk chair of the proper height for writing is always needed, and reading or study chairs can be selected from a large assortment in the offerings of the different manufacturers to suit individual demands. There are many new shapes on the Mission and Arts and Crafts order, especially made for this purpose. Another useful accessory is a library sofa, which, to be suited to its location, should be dignified in style, and upholstered in durable, unaggressive-colored material.

A writing desk and study table are of course essential. The selection can be taken from the early English, Dutch, or Colonial forms, and our own Mission patterns. The old-fashioned writing desks with sloping fronts are so much in demand that many manufacturers are making perfect reproductions, and whether new or antique the type is dignified and suited to the library. A study table must be for general usefulness, of good size, and strongly constructed.

A steel frame for holding a large dictionary is a practical article for the library. A stand to hold a complete set of encyclopædias, and a revolving bookcase for reference books might also be placed in a convenient corner.

Even the smallest library attains its full usefulness only when properly classified and catalogued, so that its resources on any subject may be learned at a glance, and any desired book found immediately.

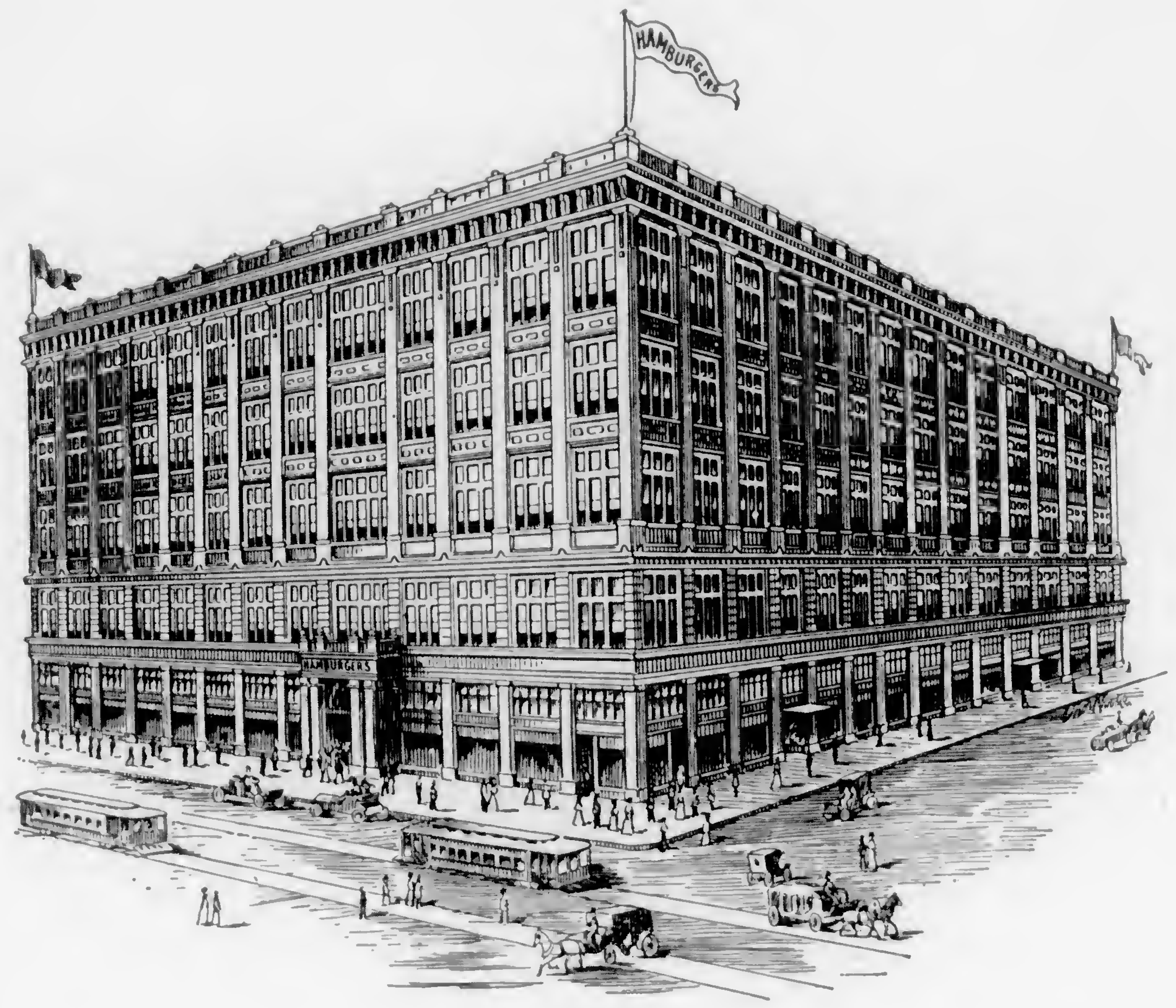
The color scheme should not be as dominating in the library as in other rooms of the house, although it should be carefully planned, not only to be correct in itself, but to unite harmoniously with schemes of adjoining rooms. Bright colors should be avoided on walls, furniture and floors and at the windows. Greens, blues, buffs, and browns are used to excellent effect because of the many possible feasible tones that can be made from them.

The colors in the library should blend. A study of nature during the autumnal season will offer many suggestions. The deeper shades for the floor, woodwork, and furniture, the medium ones for the curtains, and the lightest ones for the walls and ceilings.

In private libraries white woodwork—although it has its devotees—usually makes too vivid a contrast with everything with which it comes in contact to be a restful element. In public libraries, however, it is used to excellent advantage where plenty of light is needed. As examples we cite the numerous Carnegie libraries decorated in this scheme.

The pictures for the library wall should be few in number and sedate in appearance. They should not attract attention. Paintings of landscapes or marines are often reposeful. Busts or portraits of eminent authors add to the intellectual atmosphere of the room.

A poorly lighted library defeats the purpose for which it has been set apart, and a full provision of lamps and drop lights is required for every part of the room that is occupied in the evening. If a table is placed in the center of the room, one of the electric table lamps now made especially for the library adds a decorative value as well as casting a pleasant light in all directions. Hanging shades in mosaic glass are also to be recommended. Bronze lighting fixtures into which electric bulbs have been carefully inserted add greatly to the appearance of the room. They are made in any style, and to suit any decorative scheme.



Hamburger Building, Los Angeles
Equipped with Otis Elevators *A. F. Rosenheim, Architect*

Steel Frame the Safest Method of Building Construction

By ALFRED F. ROSENHEIM, Architect*

I HAVE frequently been accused of being an out and out "steel man," but desire to correct such an impression, because I am not at all prejudiced and not at all blind to the virtues and possibilities of reinforced concrete when confined to its own particular sphere.

The subject is one of vital interest to all engineers and architects, inasmuch as the use of reinforced concrete is, comparatively speaking, of recent introduction for buildings, and because it seems to possess an element of grave danger unless handled with extreme care and intelligence, even by men well fitted through training and education.

I believe it would be perfectly safe to venture the statement that we are practically all agreed that well designed steel construction, properly protected and fire-proofed, for whatever purpose it may be utilized, is superior to any other method of construction that has been yet devised and that it is the safest method because the calculation of stresses, strains, loads, etc., has been reduced to an exact scientific basis. On the other hand, I seriously doubt whether a similar assertion can be made with respect to reinforced concrete construction.

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* Mr. Rosenheim is architect of the Hamburger Department Store building, Los Angeles, the Annex of which is built of steel, concrete and tile. Mr. Rosenheim's experience with concrete has been limited to this single case. Only parts of the architect's article, which was read before the Engineers and Architects' Association of Southern California, are printed.

Be that as it may, I shall assume, for the sake of the argument, that the merits of the two methods of construction may be arrayed under the following headings:

1st—Cost.
2nd—Stability under normal conditions.
3rd—Stability under abnormal conditions.
4th—Term of service.
5th—Adequacy against destruction by fire.
6th—Favorable conditions for repairs or changes.
7th—Liability of minor mistakes during construction of the work, leading to dangerous failures.

First—It is affirmed that the cost of the square area under the reinforced concrete system is less than that wherein structural steel is used.

Second—It is affirmed that the static strength of reinforced concrete, under normal conditions, is equal to that of steel construction.

Third—It is affirmed that the stability of reinforced concrete, under abnormal conditions, is inferior to that of steel construction for the following reasons: Assuming abnormal conditions to be the result of an earthquake shock, or of uneven texture of the ground, wherein vertical impact, whether gradual or sudden, or up or down, occurs, the condition of the rigidity of reinforced concrete construction would be in direct antagonism to the favorable factor that is really desired under such abnormal conditions, viz.: elasticity or flexibility, as it can be proved that, wherein a structure is flexible or even articulated at certain points, then such construction does change the vortex action of earthquake shock as it enters the building at the base and transmutes said shock into a horizontal regular motion, which last motion can be assumed to be less destructive to the parts of the building; wherein, if the entire building is monolithic or rigid, the complicated initial shock at the base is carried vertically upwards in its original force and intensity, and portions of the building must be disrupted in order to secure an equilibrium.

Fourth—The term of service is as yet undetermined, no experience given as to the time or limit of existence, without impairment. It would be reasonable to suppose that a material like steel, unprotected by concrete, would be less liable to changes of nature such as crystallization or otherwise, than steel which is buried and impacted in concrete, and forming an integral part thereof, in accordance with the law that the association of two kinds of varied nature brings them together in the course of time to one kind of attribute and nature. The likelihood is that steel, imbedded in concrete for 100 or more years, will more closely approximate the nature of cast iron than it will the nature of laminated steel.

Fifth—It is affirmed that there is no inferiority of concrete to fire clay for fireproofing, but there may be superiority of strictly first-class fire clay, under proper construction, to that of concrete.

Sixth—Without question the cost of demolition or change of reinforced concrete work is about equivalent, or nearly so, to the cost of first construction.

Seventh—Granting that the primary factor of reinforced concrete construction is that of manual placement, both of physical and chemical manipulation, there must certainly be at least 20 per cent of errors made therein to 1 per cent of errors made in steel construction, even allowing reasonably for honesty of purpose on the part of the contractor.

I can do no better than to quote from an editorial which appeared in the "Cement Age," May, 1901, a paper devoted to the interest of reinforced concrete: "The cause of reinforced concrete construction would seem to stand in danger of being damned, not by faint praise but by too much praise. Some warm admirers of this system have rushed into print with articles attributing to reinforced concrete every virtue which is possible for a building material to possess. They have gone so far that one may easily question their motives. Are they always disinterested?

"Now, reinforced concrete is possessed of a great many substantial virtues and is without many of the defects of other material or systems, which are classed as among its various rivals, but unfortunately it is not as yet a method of building that can be called FOOL-PROOF.

"The recent harsh criticisms which have been made of a large reinforced concrete building, which has been finished lately, while grossly exaggerated have unfortunately a certain basis of truth.

"The contractors were evidently imbued with the idea that anyone could build a satisfactory concrete building, that knowledge and experience were not essential, that the engineer's designs for reinforcement need only be followed in a general way and that in any case the result was one sure to be entirely satisfactory.

"Now, no contractor in his senses would dare depart from the detailed drawings of the engineer, were the construction a steel bridge, then, why should he take such a risk for a building, which may at times contain a large number of people?

"Good concrete construction leaves little to be desired in strength, absolute perfection of fire-proofing and durability, but poor concrete construction has in itself elements of serious danger, those very qualities of monolithic construction and massive weight, which add so much to the strength of the well-built structure, become a menace in the case of those poorly built.

"The temptation to the contractor who has taken a concrete job on a lump basis to save, a trifle here and a trifle there, is a most insidious one.

"It is well nigh impossible for even the most expert engineer, inspector or superintendent to detect these little savings of the contractor."

Quoting an eminent structural engineer in the East:

"My own opinion based on observation and experience is, that the factor of safety used in the various forms of this construction are insufficient. We use a factor of safety of about four on steel, a product which now is of very uniform quality due to the modern method of manufacture; moreover, this product can be easily inspected chemically and physically for surface defects. The steel comes to us and is so inspected at the mill before shipment in a finished state and only requires to be set in place, which is done by trained mechanics, still, there is very little at the building for the workmen to do that can affect its strength. On the other hand we are asked to accept the various forms of reinforced concrete with practically this same factor of safety, for a product which depends for its strength and safety on a number of variable elements, such as the quality of the cement, the quality of the sand, the size and hardness of the aggregate of broken stone, the efficiency of mixing, the quality of the reinforcing metal, the accuracy of putting the reinforcing metal in place, the efficiency of putting the concrete in place and of tamping it—now, most of these elements depend upon unskilled labor for as yet there are no skilled concrete mechanics.

"You will see that whereas this new form of construction is rapidly advancing in popularity due to its cheapness and novelty, it is the part of wisdom to demand higher safety factors, at least until such time as the method has become fully developed and established and the mechanics skilled workmen."

Brick Pavements on the Pacific Coast

COMPARATIVELY few people in California have much familiarity with vitrified brick for street paving due almost entirely to the fact that no brick of this class have been produced anywhere in the state except at Los Angeles, where the only deposit of clay suitable for this purpose has been found.

Throughout the eastern cities, however, this form of pavement has been rapidly adopted after varying degrees of dissatisfaction and failure with every known kind of paving material. Before proceeding further let us consider briefly what constitutes a good quality of paving brick. The specifications adopted by the National Brick Manufacturers Association and approved by leading municipal engineers require all brick to be not only first-class and thoroughly vitrified but to withstand the very severe rattler test prescribed by the Association, they must be tough as well, not brittle like glass.

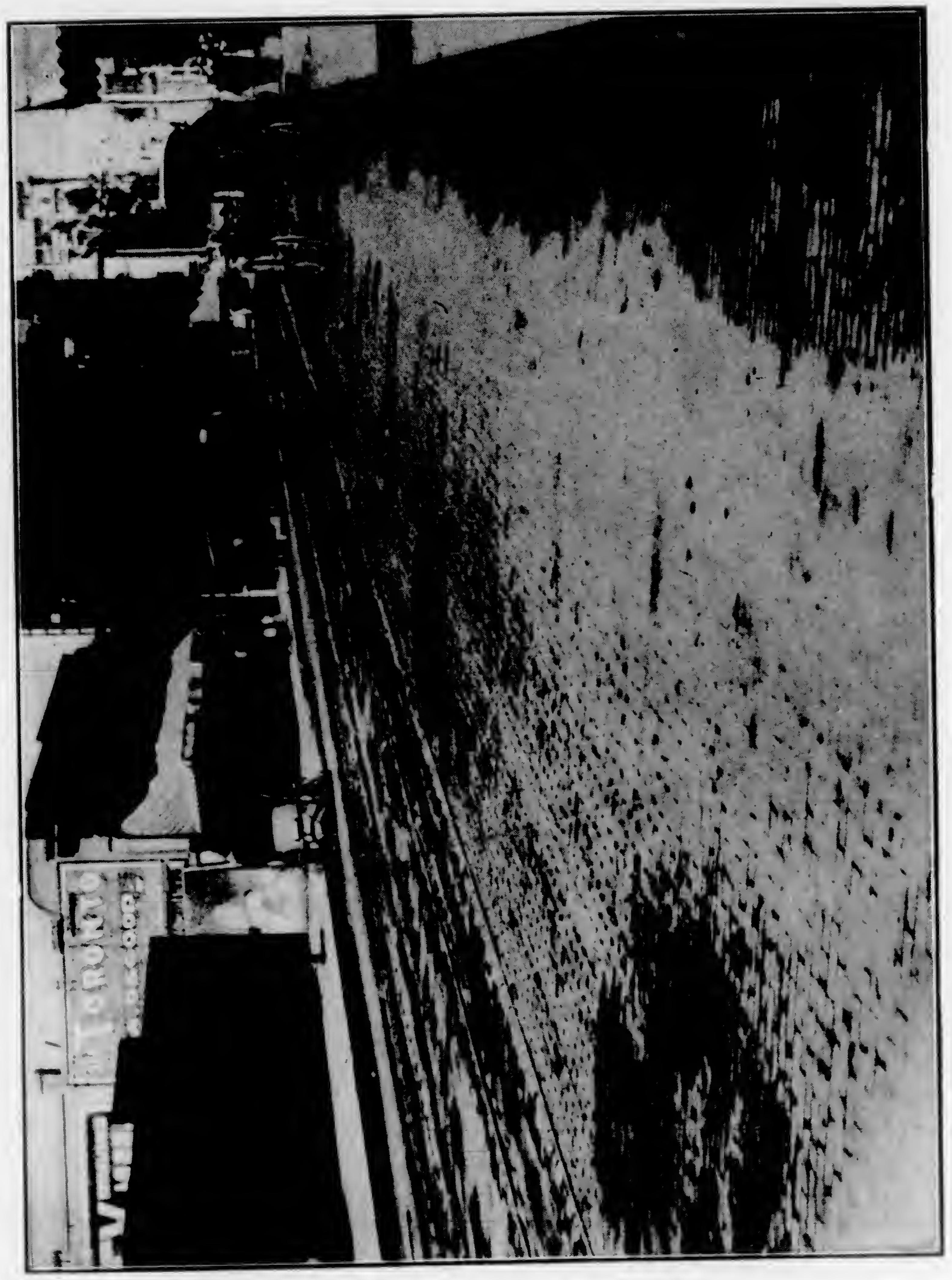
The standard rattler or tumbling barrel is made up of cast iron staves about one-half inch apart. Eight per cent of the cubic contents or ordinarily ten of 3¼-inch blocks weighing eighty-five to ninety pounds, together with three hundred pounds of sharp iron cubes, some of which outweigh the brick, are placed in rattler and after one hour of thirty revolutions per minute, shall not exceed twenty per cent loss of weight. A large proportion of paving brick used does not exceed 14 to 17 per cent. This case applies to the Los Angeles Pressed Brick Company who have frequently had tests as low as 12 and 13 per cent.

The first brick pavement put down in Los Angeles was about four years ago, when Fourth street, from Spring to Main, was paved, three-fourths being of vitrified brick and the balance asphalt. The latter was laid by one of the large asphalt paving companies and is undoubtedly the best piece of that kind of paving ever put down in Los Angeles. Not long after completion of pavement, the brick part was cut through for entire length of block to allow placing conduit with connections to the buildings, but today there is no evidence of the pavement having been disturbed. In every respect it is as good as the day when laid. The short strip of asphalt is now showing chuck holes and patching will soon be in order. Los Angeles and Seattle now have many miles of brick pavement and are using millions of vitrified brick annually in laying permanent streets and roadways.

It may be interesting to note the experience of some eastern cities, for instance in Geneva, New York, a brick pavement was put down many years ago under a guarantee by the contractors for a term of fifteen years, which provided that the street be kept in repair for the first five years without cost to the city, the second five years at two cents per square yard and the succeeding five years, three cents per square yard. At the end of ten years the city authorities voted to discontinue the guarantee as the pavement showed no perceptible wear and in their estimation would continue to last for from twenty-five to fifty years. The pavement is subjected to heavy traffic, fifteen ton loads frequently traversing it. At one time a steam roller of that weight passed over it with cogs in the wheels, but caused no injury.

The expense of keeping asphalt streets in repair became so grievous a burden upon the taxpayers of Binghamton, New York, that the citizens voted to do away with that kind of paving entirely and in the future use nothing but vitrified brick. Canton, Ohio, has nothing but brick pavements, which have been in use for about seventeen years. The engineer of that

A Perfect Pavement of Vitrified Brick.
Fourth Street, Between Spring and Main Streets, Los Angeles, Cal.



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city states that cost of repairs are practically nothing and estimates the life of brick under heavy traffic from twenty-five to thirty years, under light traffic indefinite.

Vitrified brick is in such popular esteem in Cleveland, Ohio, that approximately twenty-five million are used each year. Not only are the business streets, where heavy and continual traffic prevails, paved with brick, but many of the residential avenues as well. All thoroughfares acting as arteries to the city have been paved to the limits, from where the county commissioners have taken up the work and extended brick roads many miles into the open country. This latter is of enormous benefit to the farmers, as they are enabled to carry heavy loads at all times, being entirely independent of wear and tear and the elements, which make other roads impassable.

Attention is called to comparison of two photos herewith reproduced, needing no further comment other than statement that both are but moderately traveled streets in the residence section of Terre Haute, Indiana. South Sixth street, paved with brick in 1891 and in perfect condition after sixteen years' service when photographed in 1907. North Seventh streets was paved with asphalt in 1893. Look at it now.

Minneapolis and St. Paul, Minnesota, the latter city after unfavorable experience with wood blocks and asphalt, are large consumers of brick. Des Moines, Iowa, has upwards of seventy-five miles of brick pavements which are preferred for heavy traffic and low cost of maintenance. The history of Newark, New Jersey, has been not unlike that of many cities of the Pacific Coast, wherein repairs to asphalt have cost one thousand dollars per mile per year. In the case of Newark this enormous drain of public funds has been greatly diminished by the extended use of brick paving and the entire elimination of asphalt. Philadelphia also believes in the merits of well-laid brick streets having in good condition over one hundred and fifty miles of that class of paving, part of which has been subjected to heavy travel for twenty years. Chicago, Galesburg, and Joliet, Illinois; Lincoln, Nebraska; Indianapolis and Kansas City total hundreds of miles of brick streets. Further repetition is, we believe, unnecessary.

It is an established fact that a good class of brick pavement is as enduring as time, its freedom from dust, its non-absorption qualities, the perfect footing it affords to horses, all appeal strongly to progressive cities. Also its appearance is greatly in its favor, for there is no finer looking pavement than a well-laid brick street, the soft color of which is in perfect harmony with the green of the lawns and boulevards. With the same expenditure of force forty per cent larger loads can be hauled over it than over any other kind of pavement.

Other uses of paving brick than those above mentioned, are for gutters in place of cement. Formerly either cement or cobble stones were used. The first named soon gives out and the latter not only is more expensive and very noisy but is unsightly as well. Recently the Board of Public Works of Los Angeles adopted new specifications for vitrified brick gutters, to be used in residence section where traffic is of course light, allowing twenty to thirty per cent abrasion in rattler test as compared to twenty per cent required for similar work in the heart of the city.

A foundation of three inches concrete is first laid, on this a sand cushion of about two inches and then the paving blocks laid flat and grouted with cement. This does not cost more than cement, produces a beautiful effect and will last for generations without any expense. Another growing demand for paving brick is for residential work, such as private driveways, walks, alleys, outside chimneys, etc.

Portland, Oregon
High School Competition

Successful Contestants

WHITEHOUSE AND HONEYMAN,
Architects

First Prize

THOS. J. JONES - - Architect

Second Prize

KABLE & KABLE - - Architects

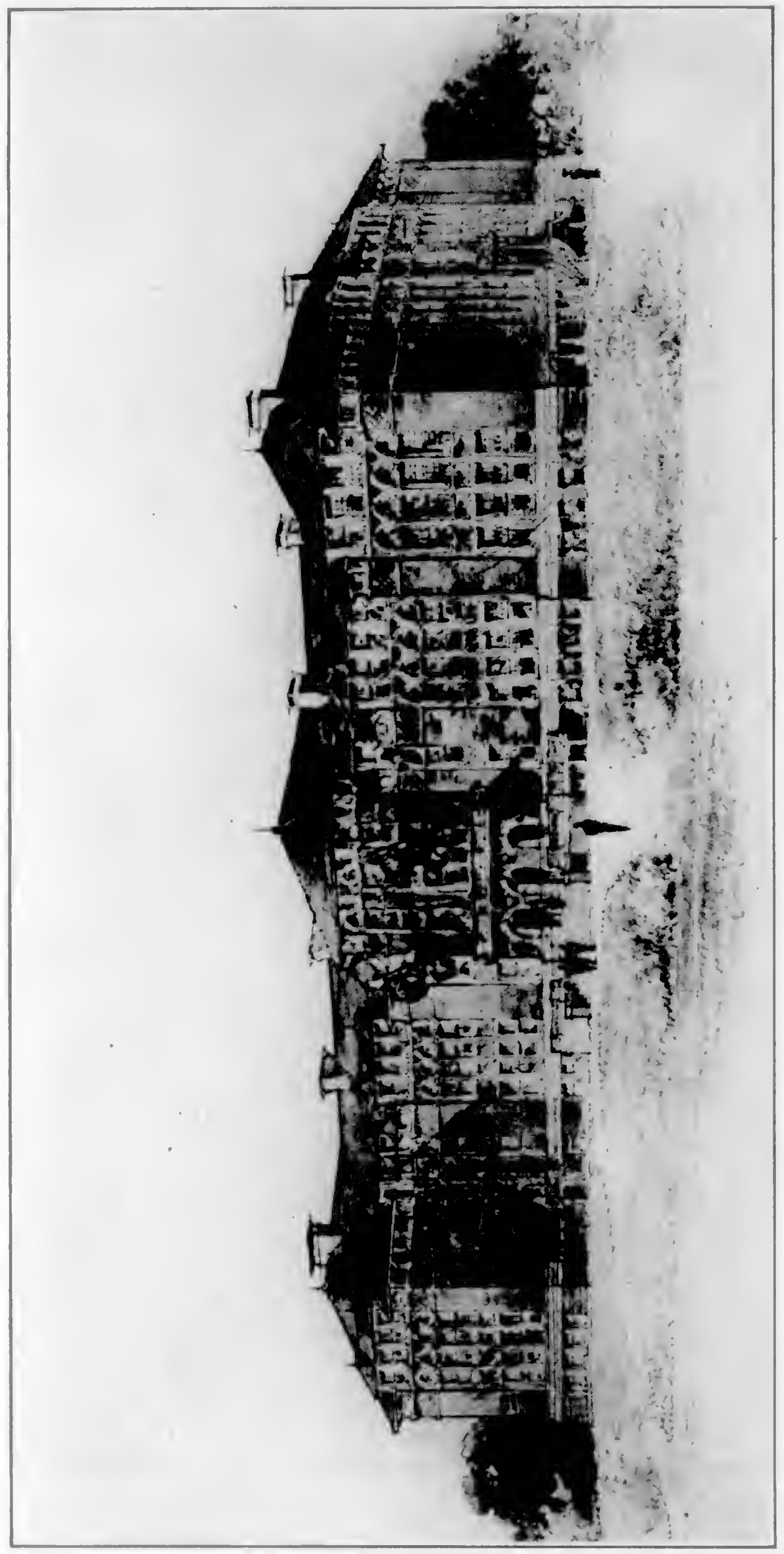
Third Prize

McNAUGHTON, RAYMOND & LAWRENCE,
Architects

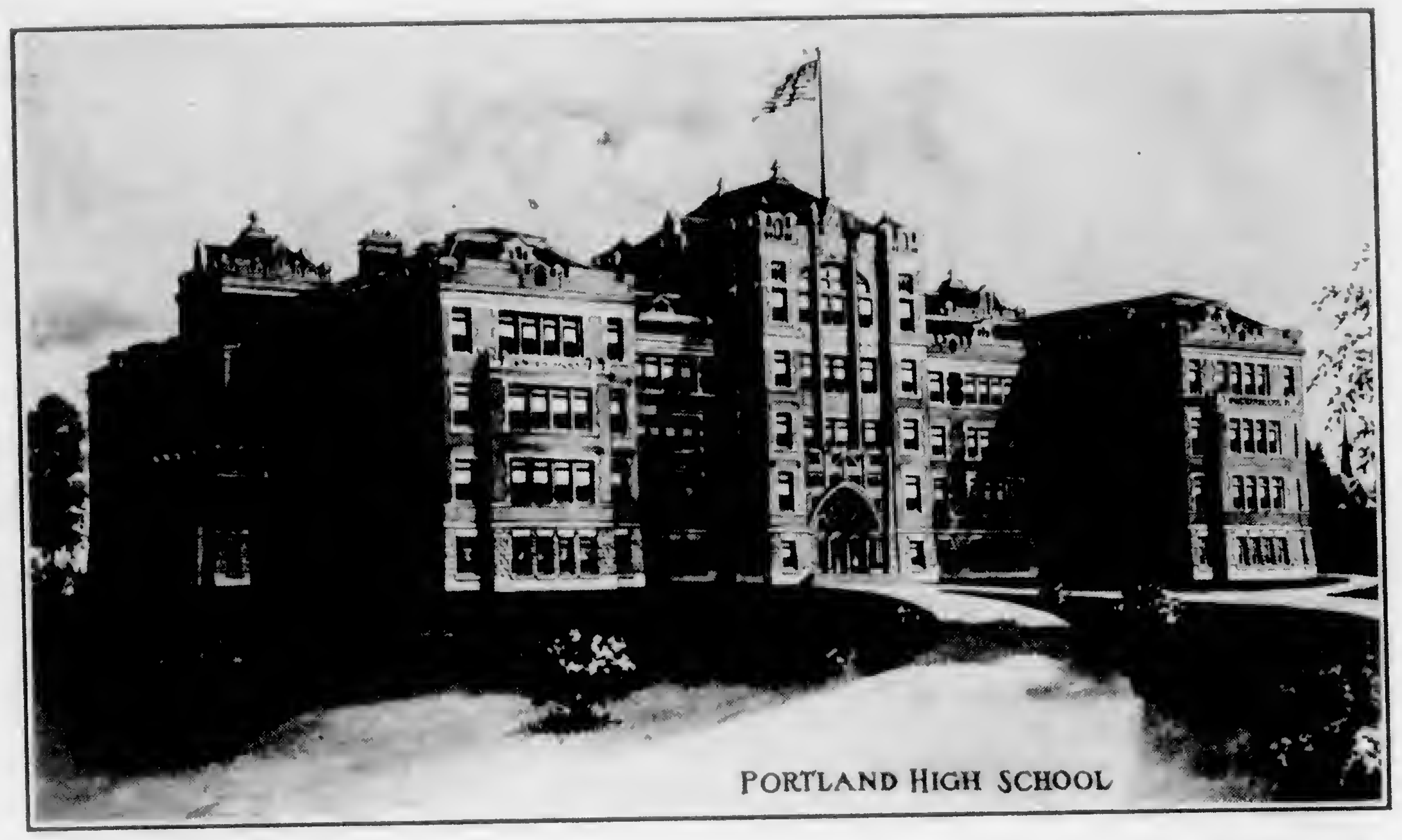
Committee of Award

Portland School Board, assisted by
W. M. Summerville, Architect, of
Seattle, Wash.

Cost of Building, $250,000.



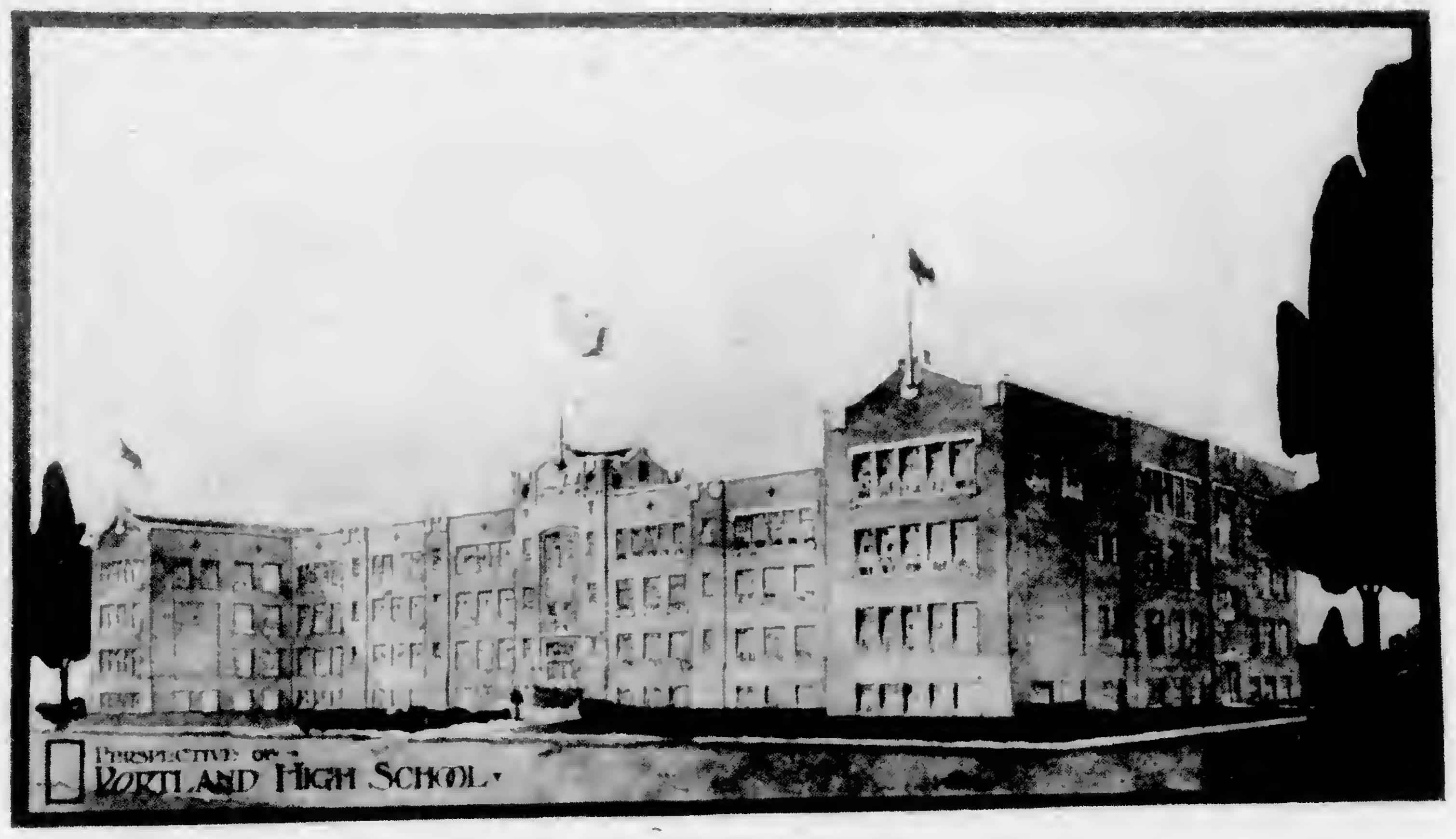
Successful Design, Portland, Ore., High School Competition
Whitehouse & Honeyman, Architects


PORTLAND HIGH SCHOOL

Portland, Ore.,
High School
Competition

First Prize:
$300.00

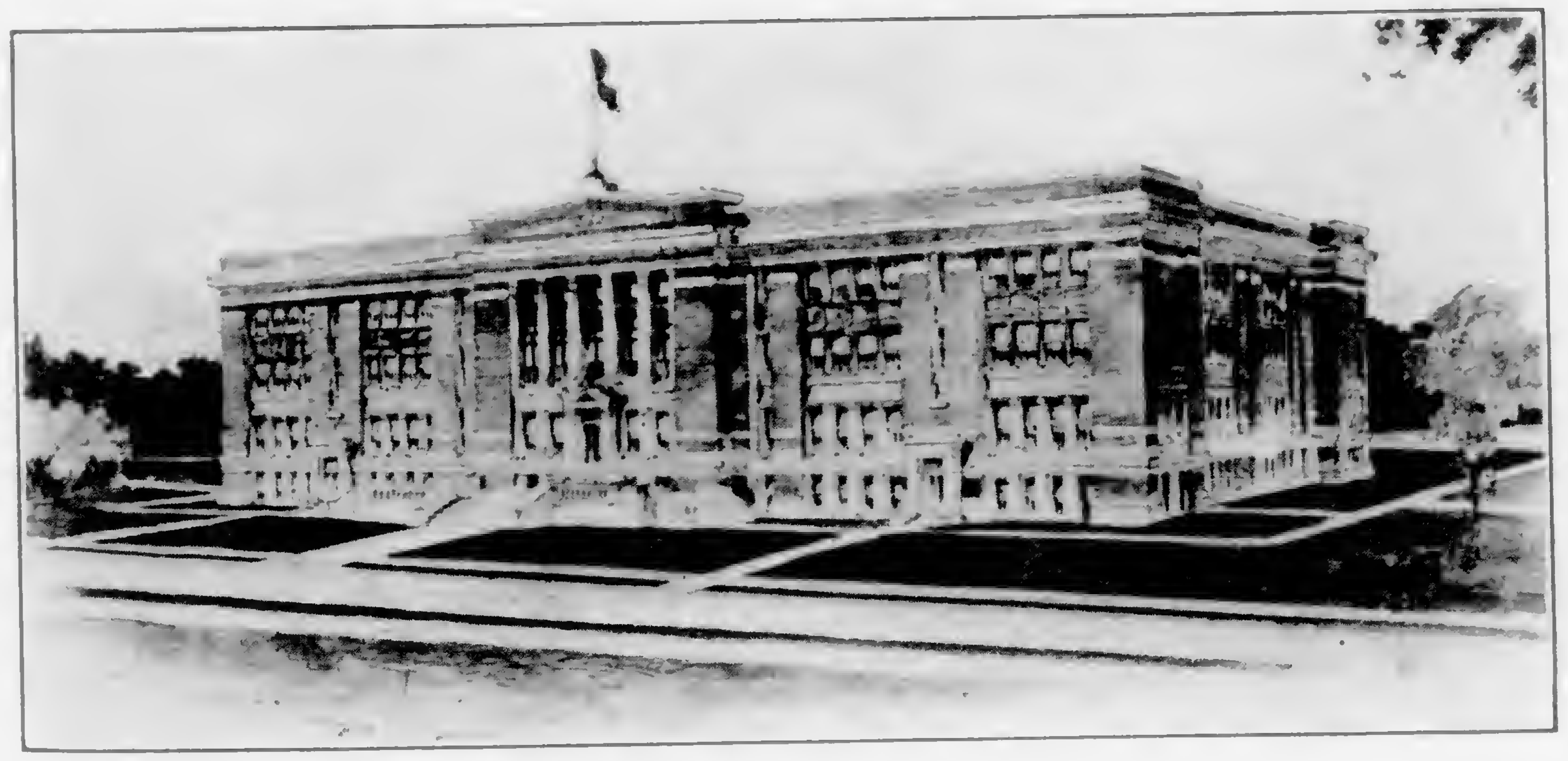
Thos. J. Jones,
Architect


PERSPECTIVE OF
PORTLAND HIGH SCHOOL

Portland, Ore.,
High School
Competition

Second Prize:
$200.00

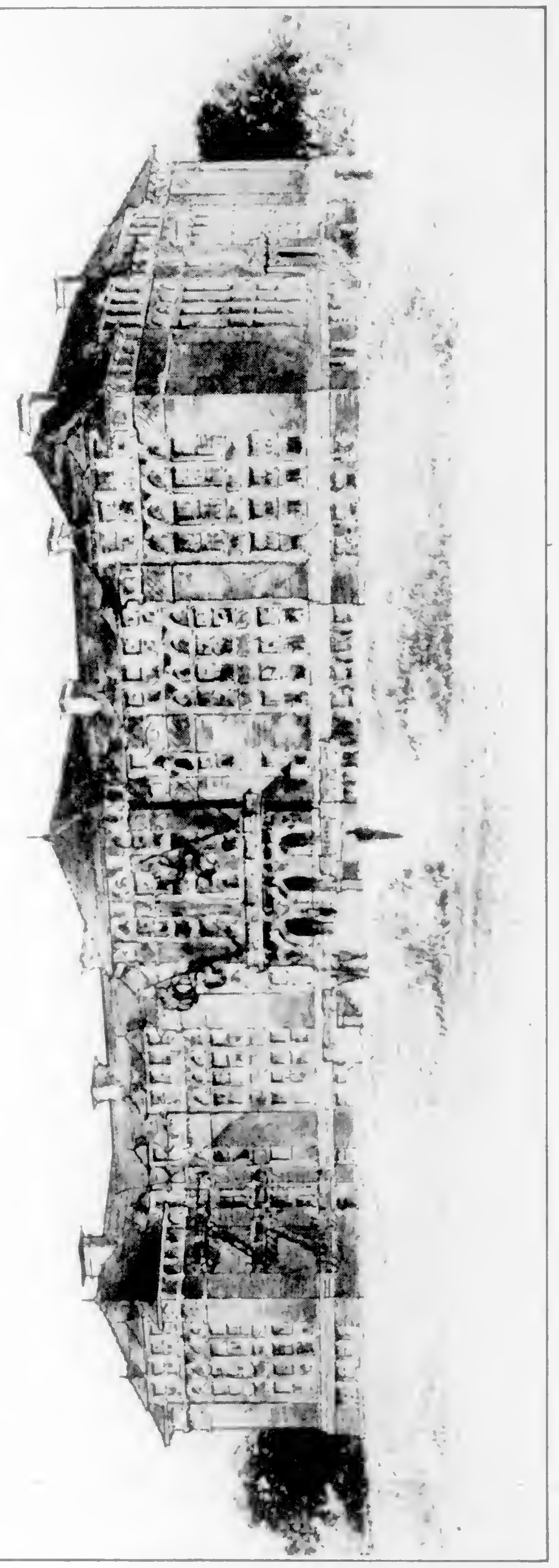
Kable & Kable,
Architects



Portland, Ore.
High School
Competition

Third Prize:
$100.00

McNaughton,
Raymond &
Lawrence,
Architects



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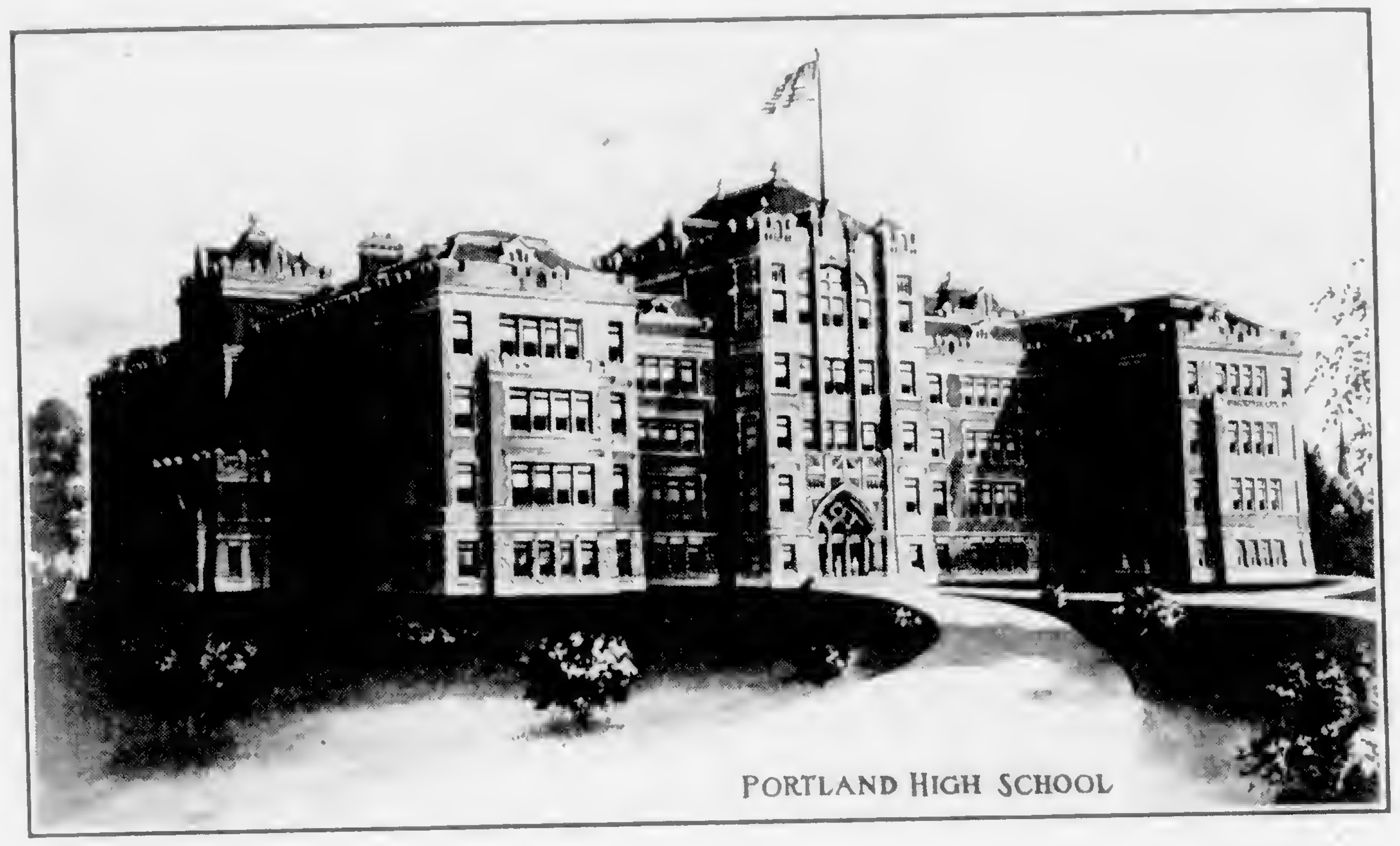
PORTLAND HIGH SCHOOL

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Competition

First Prize:
$300.00

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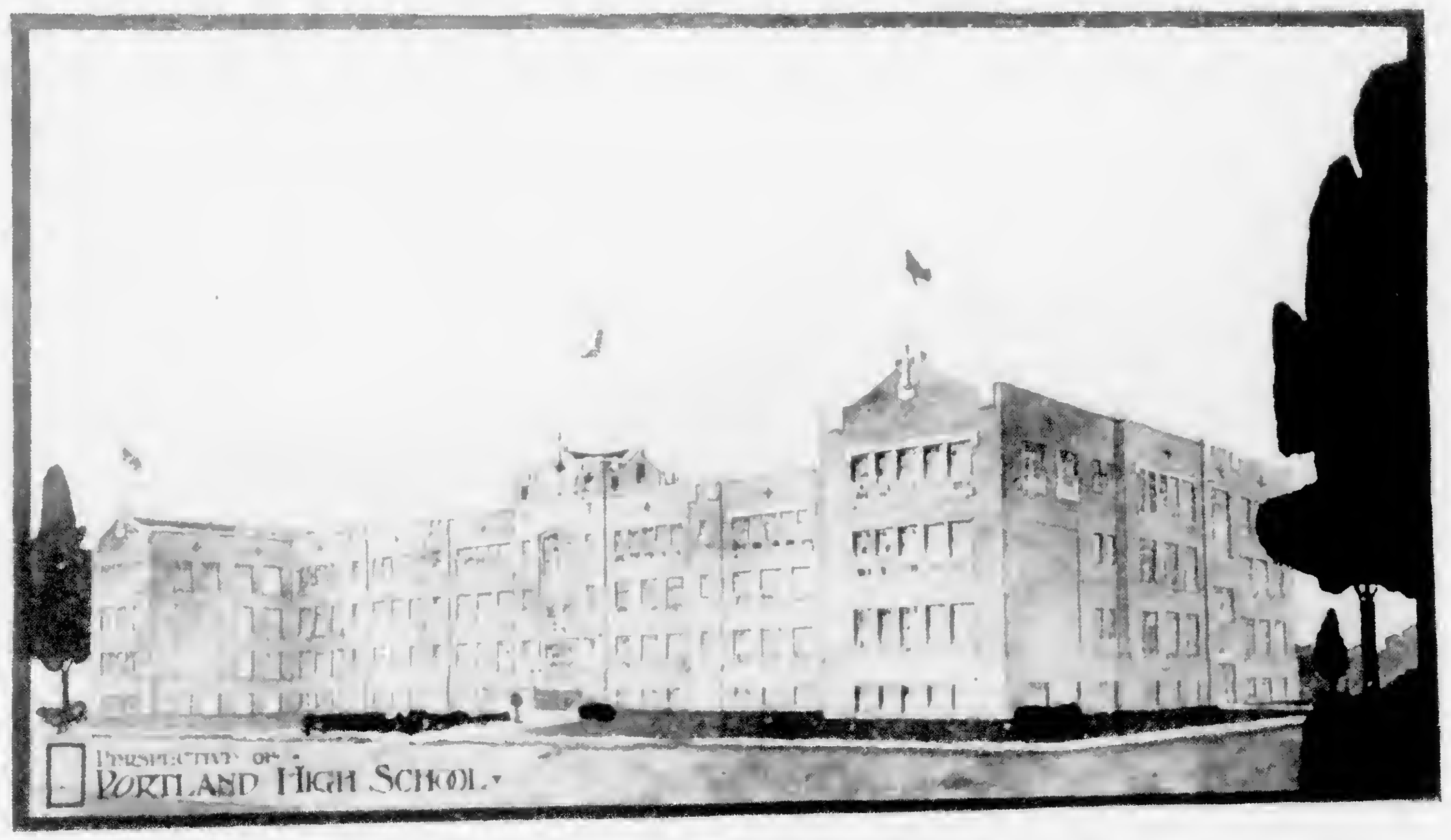
Architect


PERSPECTIVE OF PORTLAND HIGH SCHOOL

Portland, Ore.
High School
Competition

Second Prize:
$200.00

Kable & Kable,
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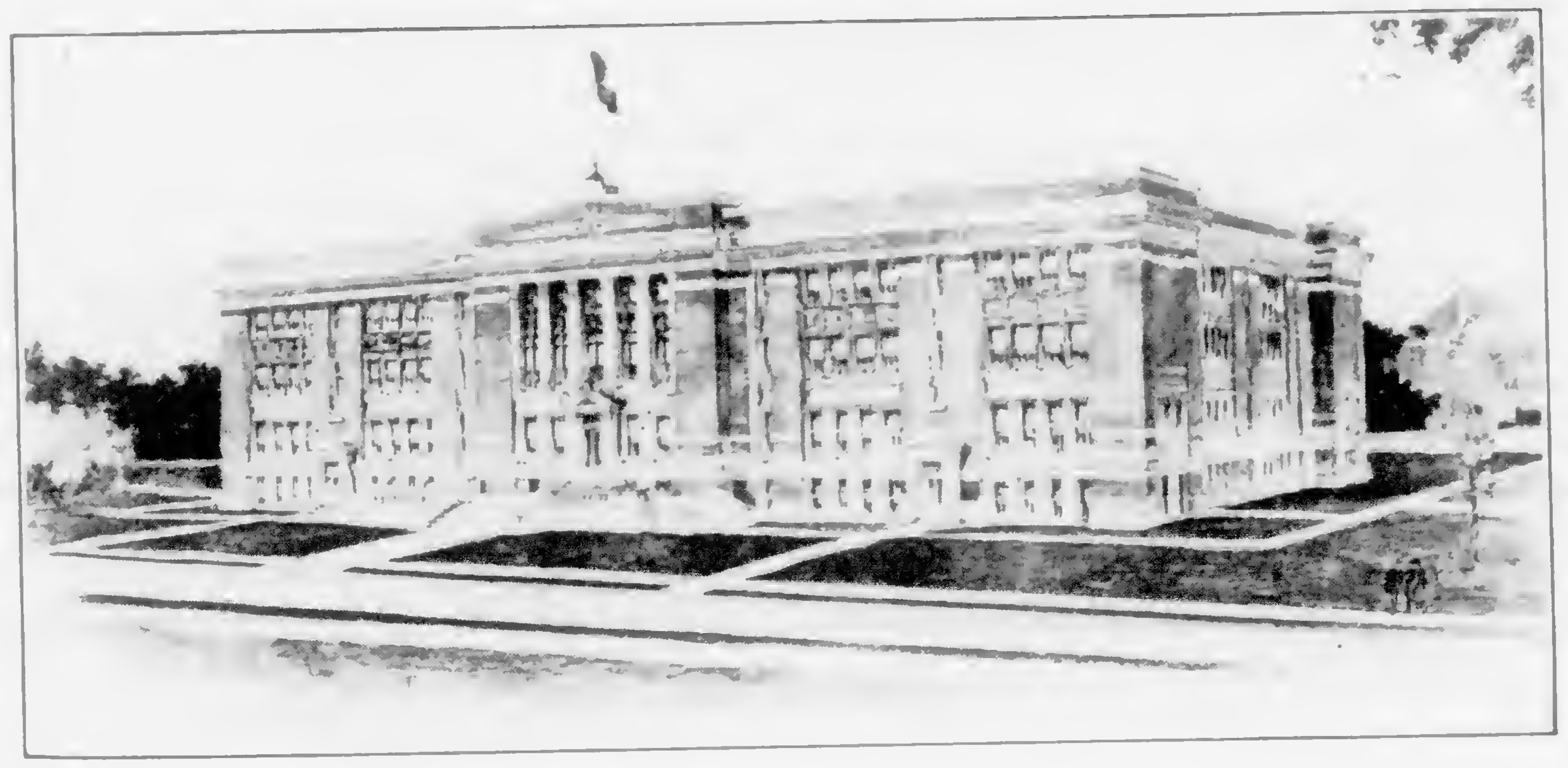

Portland, Ore.
High School
Competition

Third Prize
$100.00

McNaughton,
Raymond &
Lawrence,
Architects

Recent Federal Tests of Plain Concrete Beams*

By RICHARD L. HUMPHREY,
Engineer in Charge of Structural Materials Investigations

AT THE Structural Materials Laboratories of the United States Geological Survey in St. Louis, Mo., a series of important tests on the strength of plain concrete beams has just been completed. These tests form part of a comprehensive series of investigations undertaken by the Government for the purpose of determining the strength of concrete and reinforced concrete. The results will be printed within the next few weeks in a bulletin of the United States Geological Survey.

The work involved in these investigations consists of a study (1) of the constituent materials of concrete, (2) of its strength when molded into various structural shapes, and (3) of the methods by which its maximum strength may be developed through various forms of metallic reinforcement.

Although it is true that concrete possesses but little strength in tension and must be reinforced with metal to resist tensile stresses, it is believed that no study of concrete would be complete without a series of tests establishing its strength without reinforcement.

The tests reported indicate that concrete is unsuitable for use under conditions where it must resist tensile stresses, because of the small loads it will sustain and particularly because of the suddenness with which it fails, in striking contrast to the behavior of reinforced concrete, which usually shows a gradual development of cracks preceding failure.

This first series of beam tests covers 144 beams without reinforcement 8 by 11 inches in section and 13 feet long, together with corresponding compression test pieces, consisting of cylinders 8 inches in diameter by 16 inches in length and of 6-inch cubes. Of these tests those on 108 beams of 12-foot span, with their cylinders and cubes, and those on 108 beams of variable spans, 6 to 9 feet, which were made of the larger part of the 13-foot beams after rupture, are reported and comprise all of this series except the 52-week tests.

An attempt has been made to bring out, if possible, the comparative value of gravel, granite, limestone, and cinders for use in concrete; the effect of age and consistency on the strength, as shown by the modulus of rupture of the long and short beams and by the ultimate strength of the cylinders and cubes; and the influence of age and consistency on the stiffness, which is indicated by the unit elongation of the long and short beams and by the initial modulus of elasticity, as determined by tests of the cylinders.

Three consistencies—wet, medium, and damp—were somewhat arbitrarily chosen. Tests were made at the ages of 4, 13, 26 and 52 weeks.

No attempt will be made in the coming bulletin to generalize the results of the tests presented, or to draw any conclusions, however warranted they may appear from an examination of the test data. It is hoped that the matter contained will provoke discussion, and in order to promote this end extended expressions of opinion or attempted applications of theory to results have been avoided. A running commentary on the results of the tests, however, emphasizing matters of particular interest and indicating a few points that might lead to interesting analyses will be included in the report. When the results of the 52-week tests become available it is the intention to publish a thorough analysis of the entire series in another bulletin.

The purpose of this series of tests was to determine:

(1) The effect of age on the strength of concrete;

(2) The effect of variation in the consistency on the strength of concrete; and

(3) The effect of different types of aggregates on the strength of concrete.

The first question is perhaps the most important, since an early attainment of considerable strength and no subsequent decrease in strength are two essential qualities in concrete, in order that a structure may be put to the use for which it is intended as soon as possible and that there shall be no subsequent deterioration in strength.

The least age at which any tests were made was four weeks, and at that period in no case except that of the cinder concrete, wet consistency, did the compressive strength fall below 2000 pounds per square inch, while the cinder concrete had in every case a compressive strength of at least 1000 pounds per square inch.

In every instance the compressive strength shows a substantial increase from four to thirteen weeks, with the single exception of limestone concrete mixed to a wet consistency, for which a decreased strength is indicated by the tests, a decrease which continues to the age of twenty-six weeks. This decrease in the strength of the limestone concrete is unexplainable, and the results of the fifty-two-week tests on this material will be of value as indicating whether or not this decrease continues to the latter period. The other aggregates show either the same or a slightly greater strength at twenty-six weeks than at thirteen weeks.

The transverse tests on both the long and the short beams bear out very closely the fact indicated by the compression tests on the cylinders and cubes, and lead to the belief that the tensile and compressive strength are affected alike by both age and consistency. The effect on the strength of the variation in the consistency is clearly shown. In almost every case the concrete of the damp consistency is the strongest and that of the wet consistency the weakest. This is true for the three ages at which the concrete was tested, and is confirmed by the tests of the beams as well as of the cylinders and the cubes. Attention is called to the fact that the damp consistency used is much wetter than the damp consistency used in making mortar building blocks, for which the same conclusions may not apply.

The difference in strength of the stone and gravel concretes of the three consistencies is more pronounced than in the case of the cinder concrete. The effect of the consistency on the strength seems to depend to a great extent on the behavior of the concrete while being tamped and to the method used in tamping. Great care was taken to tamp all the concretes in the same manner. The thorough mixing of the concrete is absolutely essential and has a marked influence on the consistency.

The relatively slight influence exerted by the consistency on the strength of cinder concrete may be partly due to the structural weakness of the cinders themselves, which in the drier mixtures were to a great extent broken up by the tamper, while in the wet mixtures, the cinders would move from beneath the tamper.

While it is true that in almost every instance the drier mixtures give the greater strength, it does not follow that dry (or damp) mixtures should be used in construction. Practical considerations warrant the use of a wet mixture. The difficulty in securing efficient tamping and a smooth finish in a damp concrete, the loss of strength due to the unavoidable drying out of the concrete used above water, the difficulty of securing in reinforced concrete an intimate union with the steel, and the far greater ease of placing wet concrete all seem to warrant the sacrifice of what in many cases is but a slight difference in strength for a greater case of manipulation and a thorough bedding of the steel, which is of the utmost importance in reinforced concrete work.

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* Published by permission of the Director of the United States Geological Survey.

It is dangerous to draw any general conclusions as to the relative value of concrete made of the four aggregates used unless the character of the aggregates used in this particular series of tests is carefully kept in mind. The gravel, granite. limestone, and cinders were used as available representative types of aggregates, and while the results indicate that the granite makes the strongest concrete, it should not be assumed, therefore, that a granite concrete is stronger than a gravel, limestone, or cinder concrete. Every material should be accepted or rejected on the results of the tests of its qualities, regardless of the tests of other materials of the same type. Apparently insignificant differences in two materials which appear to be similar often cause considerable difference in the strength of concrete made from them. For instance, two limestones from the same quarry crushed and screened under similar conditions—except that one was screened while wet, which caused the dust to adhere to the surface of the stone—would make concretes of considerable difference in strength.

Because the hard, flinty gravel used in these tests gave excellent results, it does not necessarily follow that a similar well-graded gravel, but composed of soft limestone or shale, would give like results. No series of investigations, however elaborate, will do away with the necessity of careful inspection of the materials to be used. The relative value of materials to be reported in this forthcoming bulletin should be recognized, therefore, as applicable only to the particular materials from which the reported physical properties were obtained.

These investigations were carried on under the general direction of Joseph A. Holmes, Expert in Charge, of the Technologic Branch, United States Geological Survey.

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A Unique Timber Testing Machine

BRIDGE builders and contractors for buildings which are intended to carry variable loads will find much of interest in a unique machine designed by the government to help them to answer the question which comes up very often: How is the strength of wood affected by repeated shocks? At the present time no satisfactory answer can be given. To fill the need for information on this important subject a special form of impact machine has been designed by the United States Forest Service to investigate the behavior of wood under repetitive loading, and it is to be built by the University of Washington, at Seattle, Washington, and is to form a part of the Forest Service Timber Testing Station operated in co-operation with the university.

This machine will be provided with a 1500 pound hammer which can be dropped upon the wood specimens under test from any height up to three feet. It is so constructed as to be both automatic and autographic. The record showing the behavior of the specimen under test is drawn on a long sheet of paper which constantly unwinds from one cylinder and rolls up on another. This record is drawn by means of a pencil attached to the hammer of the machine. When the machine is started the hammr is automatically raised to a height previously determined, when it falls on the specimen, and continues to be automatically raised and dropped until the machine is stopped.

From the results to be obtained from the tests made with this machine the Forest Service hopes to be able to devise more accurate and reliable methods for calculating the stresses which timbers used in bridges and other structures subject to repetitive loading have to stand.

Improvement of Railroad Station Grounds

By WILBUR DAVID COOK, JR.*

THE writer is pleased to note the increasing interest in the matter of beautifying railroad station grounds in the West.

An unimproved station is the exception in the East, while an improved station in the West is so rare as to excite comment. We have in Massachusetts, and in many other states as well, a most excellent state law to the effect that "all railroads (both steam and electric) earning in excess of a stipulated revenue, that such excess revenue shall revert to the state, unless expended in improvements."

This one law has done more for the improvement of stations and station grounds than all other factors combined. It will be readily surmised that the railroad companies are not particularly anxious that any of its earnings shall revert to the state, and the consequence has been that this excess revenue has been expended in lowering the tracks for the abolishment of grade crossings, improving the roadbed, the rolling stock, and the improvement of the stations and grounds.

Every road of consequence has its architect, its landscape architect, and landscape gardeners, working in conjunction with its resident engineer, and the many miles of beautiful stations, each treated distinctively attest the value of this co-operative work and is a credit to all concerned.

Work of this character calls for specialists, fully posted as regards railroad requirements, and with sufficient ability to pick out and emphasize the salient features of each situation to make the most of the site and to avoid the deadly monotony which would make one station a replica of another, if left entirely to local talent, as is often the case.

As this same law covers the electric roads a similar improvement is noted, with the exception instead of lowering the tracks the money has been spent in the acquirement of private rights-of-way with a subsequent marked improvement in the running time, making it possible for suburban residents to enjoy the benefits of living in the country, and yet keep in close touch with the city. The increase in real estate values along these well-kept rights-of-way have been enormous, so that the improvements have benefited the entire community, and the railroad companies have prospered in the increased traffic of the commuters.

One road alone (the Boston & Albany) has spent some millions of dollars since 1892 in improvements and in lowering their tracks from Boston to Worcester, a distance of forty-four miles without a single grade crossing, either afoot or awheel, and all stations are reached by means of sub-ways passing under the right-of-way, and it is a misdemeanor to be found walking in the right-of-way punishable by a term in state's prison.

In talking with a resident engineer of one of our local roads a short time ago relative to the systematic improvement of their stations and grounds, and their apparent apathy in the matter, the writer was given this particular railroad's point of view; to quote: "No, we do not encourage improvement of our grounds for two reasons. First, we have not been able to find a man who could give us a practical plan. Second, if we give up any land in the immediate vicinity of the station and we find later on that we need more room for the station buildings, and encroach upon any portions of the grounds which may be devoted to grass, trees and shrubs, we find every short-haired Women's Club in the neighborhood down upon us like a thousand of brick."

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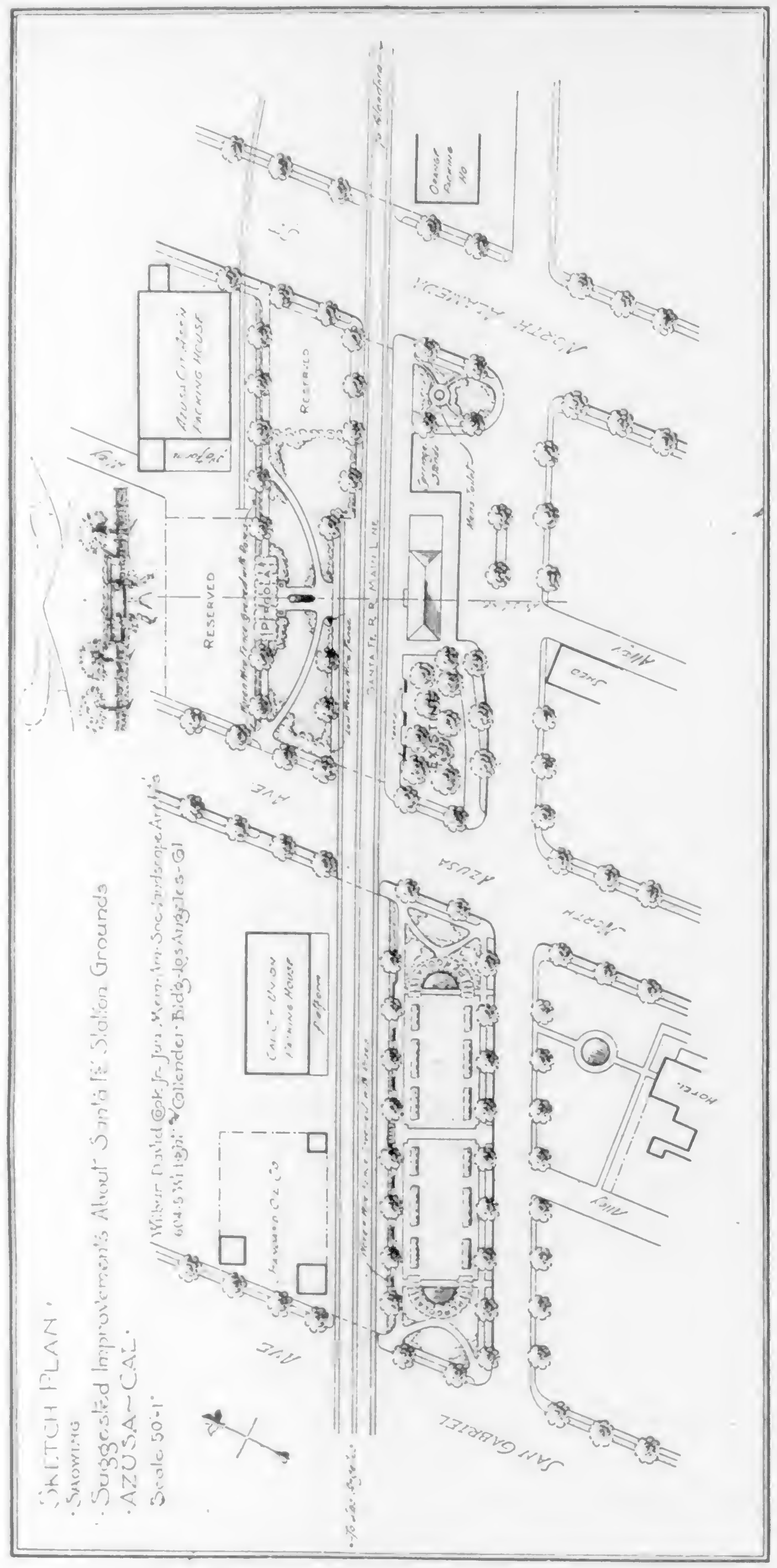
* Office, 604-5 Wright & Callender building, Los Angeles.



Suggested Improvements about the Santa Fe Station Grounds, Azusa, Cal.
Wilbur David Cook, Landscape Architect

Now, what do you think of that? Assuredly a most weak excuse—it will not hold water. The real reason is not far to seek, nor is the remedy remote for present conditions. Some such law as we have in Massachusetts would work equally well here and would be equally beneficial to all concerned. The real reason is that every available dollar earned by local traffic finds it way east to the pockets of a few stockholders, who have little interest or concern regarding the condition of the roadbed, accommodations of the traveling public, or conditions of the station or grounds as long as the dividends are regular.

These conditions will prevail just so long as the local patrons will stand for it. If every community through which a railroad passes could be made to realize the value of such improvements in good hard, cold dollars and cents, conditions would improve very rapidly.

It would be unjust and unfair to accuse all roads of a similar apathy in this matter. It is a pleasure, therefore, to note the good work that the Santa Fe Railroad is doing in this respect. Its management is broad-minded enough, liberal enough, and far-sighted enough to realize the value of meeting the people half way, and we dare say more than half way in many instances.

They have adopted a distinctive type of architecture in their station buildings, singularly appropriate to this section of the country, artistic and pleasing to the eye, but their station grounds lack that marked individuality required to make a pleasing and complete setting for their buildings. But it will come in time.

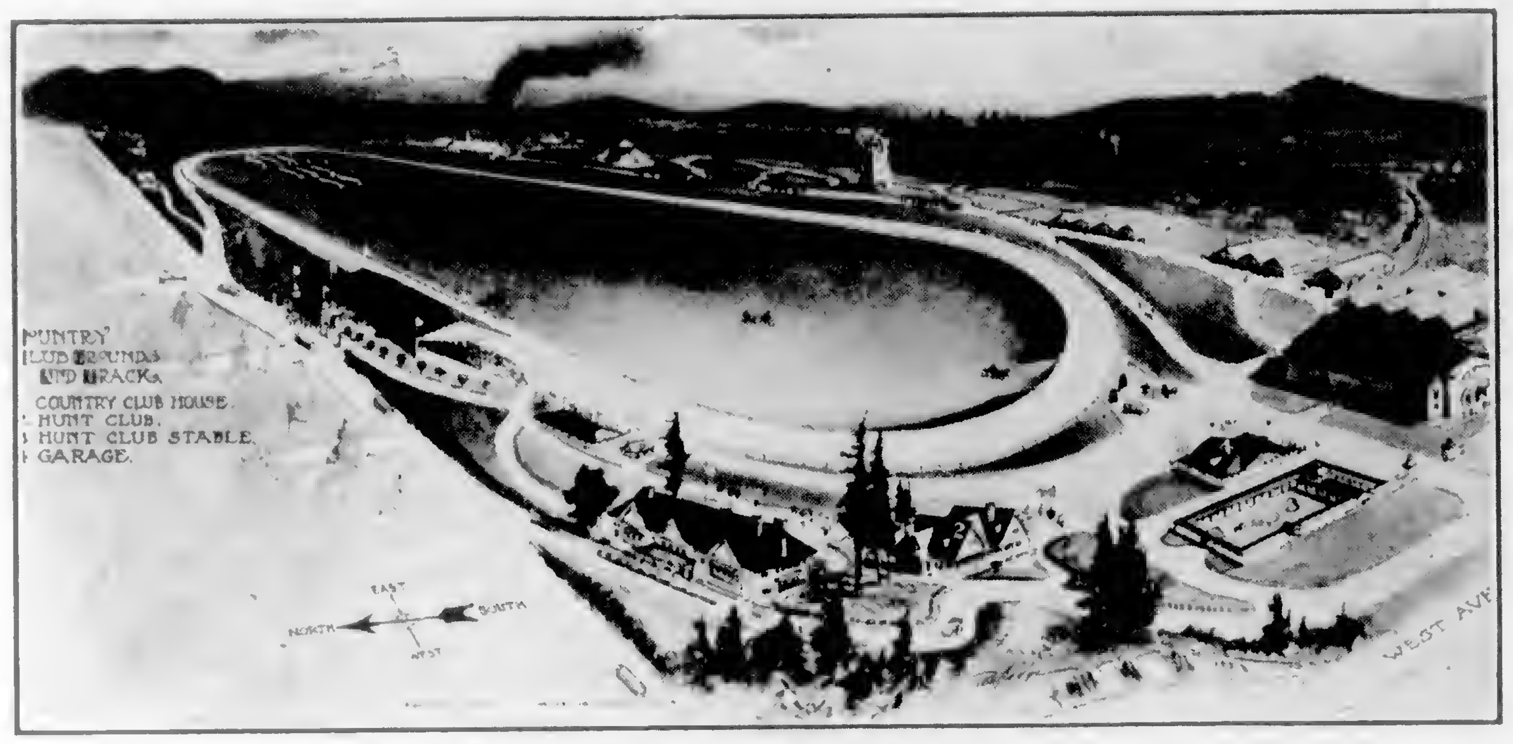
The writer does not mean to imply that it is at all necessary or advisable to expend vast sums of money on small stations in rural communities. In many places electric road competition is so sharp as to seriously affect the earnings of the steam roads, and they naturally do not like to expend money unless they see some ultimate hope of its return. It is fully believed that it is only a question of time, and a very short time at that, before the steam roads will be compelled in self-defense to electricize their rights-of-way. Some experiments are now being made in this vicinity which will be watched with considerable interest by all railroad men. There is no question of its economy and efficiency on short hauls.

He does mean to imply, however, that many of the present stations would be vastly improved by a coat of paint of a color that would not show dirt. The long dry seasons here are very hard on all kinds of station buildings.

Many of our little rural stations are very pleasing and could be made much more so by the expenditure of a little money in the screening out of objectionable outhouses in the immediate foreground, so as not to block distant view of mountains and valleys almost uniformly charming, and by covering adjoining packing houses with vines. Many opportunities are offered for the erection of rustic pergolas to be covered with climbing roses, and for the installation of seats in their shadow. Inexpensive fountains could be installed and their overflow utilized for irrigation purposes. Open water features should be made more of in California, especially if the water is not allowed to waste.

Hygienic bubble drinking fountains should find a place at every station. Platform areas should be ample and commodious. All leads to a station should be made simple and direct, on the theory that a straight line is the shortest distance between two points to a man in a hurry to catch a train. Any circular architectural feature in the direct line of traffic should be avoided; nothing is more exasperating than to be obliged to merry-go-round such a feature, which looks surprisingly well on paper but which is the source of much unregistered profanity on the ground.

Carriage or automobile stands should be provided for and their limits sharply defined by a curbing, and your station should be well lighted at night.



Plan of Country Club Grounds and Track, Portland, Ore.
E. M. Lazarus, Architect

Waste barrels should be provided for the reception of papers of all kinds, and the entire surroundings should be made spotlessly clean and kept so.

Outdoor toilets should be effectively screened both by lattice work and by evergreen plantations; lawn areas should be comparatively open for easy maintenance, and an effective display of hardy flowers should be made, of as nearly an everblooming character as could be secured.

The stations should be made contrasty and electric signs delineating the name of the station at night should be plainly visible from the train.

It is impossible in an article of this kind to fully cover the requirements of all stations. Each particular site should have a different treatment. It is hoped, however, that the few suggestions which have been made will enable the reader to more fully realize what some of our particular stations lack. Namely, character.

* * *

Cost of Concrete Construction

TO THE Architect and Engineer—Gentlemen: Being a subscriber of your valuable magazine, I would like information as to the most practical way of getting at the cost of concrete construction in foundation work, superstructure, etc. If you have a book treating on this I would like to have it. I want to contract and I want to find out all I can about figuring on the labor.

Very respectfully, S. D. HECKOIT, Eugene, Oregon.

Your question of the practical way of getting at the cost of concrete construction in foundations, superstructure, etc., is one that is impossible to answer accurately in figures.

Each locality has its own special conditions, which affect cost very materially. The character of the work is also so variable that each structure has to meet with special considerations. In San Francisco the reinforcing steel is worth about $70.00 per ton in place. This price includes all necessary bending and applies to the whole building throughout. Some portions of the work may run to considerable more and some may be less, so that the above mentioned price may be considered as an average condition. The average cost of form work in a building will vary from $6.00 to $12.00 per yard of concrete. The cost of labor in mixing and placing in position varies from $1.50 to $3.00 per yard.

JNO. B. LEONARD, C. E.

Some Phases of the Development of Concrete in Construction

By G. B. ASHCROFT, C. E.*

HAVE we said the last word on the possibilities of Portland cement and its products as the ultimate building material of the future? Cementitious materials are among the oldest and at the same time the most modern of all those with which the architects and builders have to reckon in the design and execution of their creations.

Is there any doubt that the first man who evolved a baked clay brick was forthwith commissioned by the ruler of that ancient day to produce something by which one of his bricks might be made to cohere with another? It is an even chance that this early inventor lost his wits, and probably his head at the same time, for it is a matter of record that these early potentates had very short tempers, and the contractors of those times were quite likely to receive specifications in which the "penalty clause" was something of the sort.

For unknown ages man has been using the products of nature in buildings, more or less modified as the knowledge and advancing civilization of his time permitted, and we are prone to think with complaisance, that in our day and generation we are mightily in advance of our forefathers in this respect, and yet an impartial glance over the building work of the present reveals the fact that only in the realm of iron and cement and their various applications has there been any advance worth noting, and that has been due primarily to the wonderful development of the mechanical powers. Were it not for the huge rotary kiln and the cheap electric current we would not have the present day highly efficient Portland cement and the low prices that prevail. With the coming of the good and cheap cement has come the remarkable advance in the applications of it to various phases of building, and it is concerning a few of these many uses and the results thereof that the writer would confine this article.

As a stolid framework upon which to hang the embellishments that go to make the modern building an agreeable sight, the reinforced concrete type has come to stay. In the erection of it, however, under most of the systems in vogue at present, large quantities of lumber are required, the cost of which often reaches an exorbitant proportion of the total. There is little hope that in the future the cost of lumber will be less, since the prices are rising each year in the face of an ever diminishing source of supply. Hence we must look to some other means and it forces us to the conclusion that our reinforced concrete buildings of the future will be erected without forms. Perhaps that is coming sooner than we now think. Two companies are already in the field, pioneers, with a system of columns and beams manufactured at the shop and shipped to the place of erection. The proper connection of such pieces, after once erected, is the greatest objection at present to their use, but that bids fair to be eventually overcome. It seems therefore quite probable that we shall see, in time, huge factories located somewhere near the source of supplies and turning out columns and beams, in stock sizes, under uniform mechanical processes, that insure reliability of product, in a manner quite similar to the steel practice of the present day.

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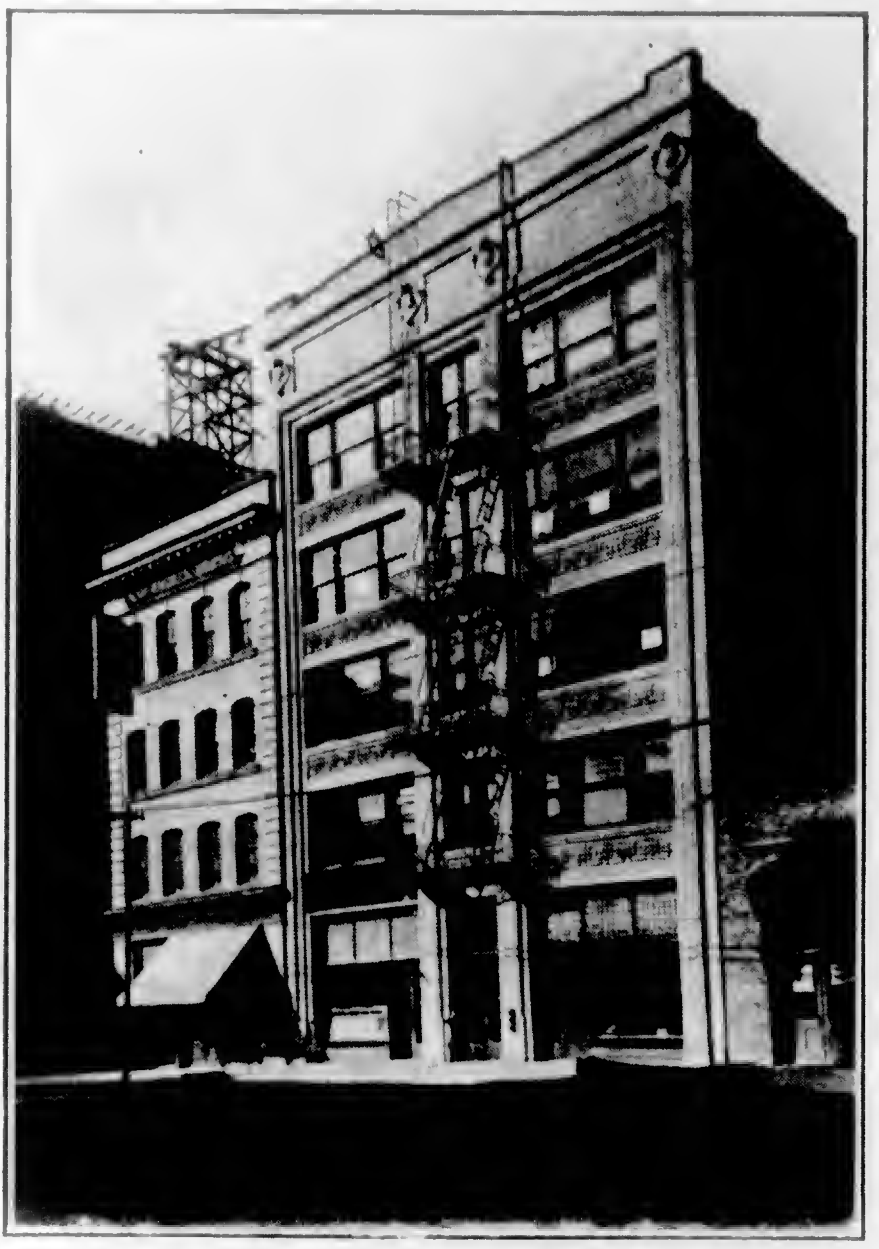
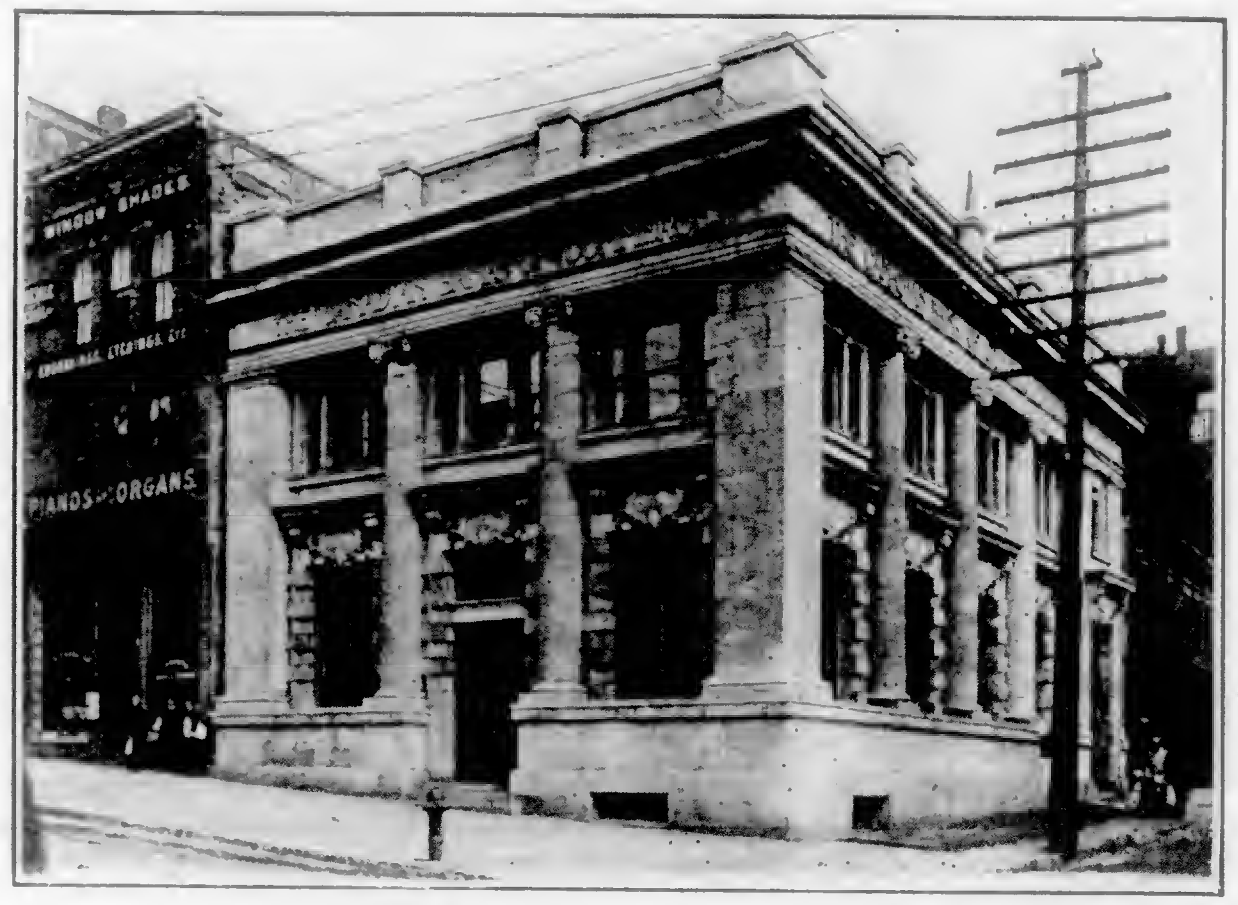
* Mr. Ashcroft is manager of the Cement Products Company, Balboa building, San Francisco.

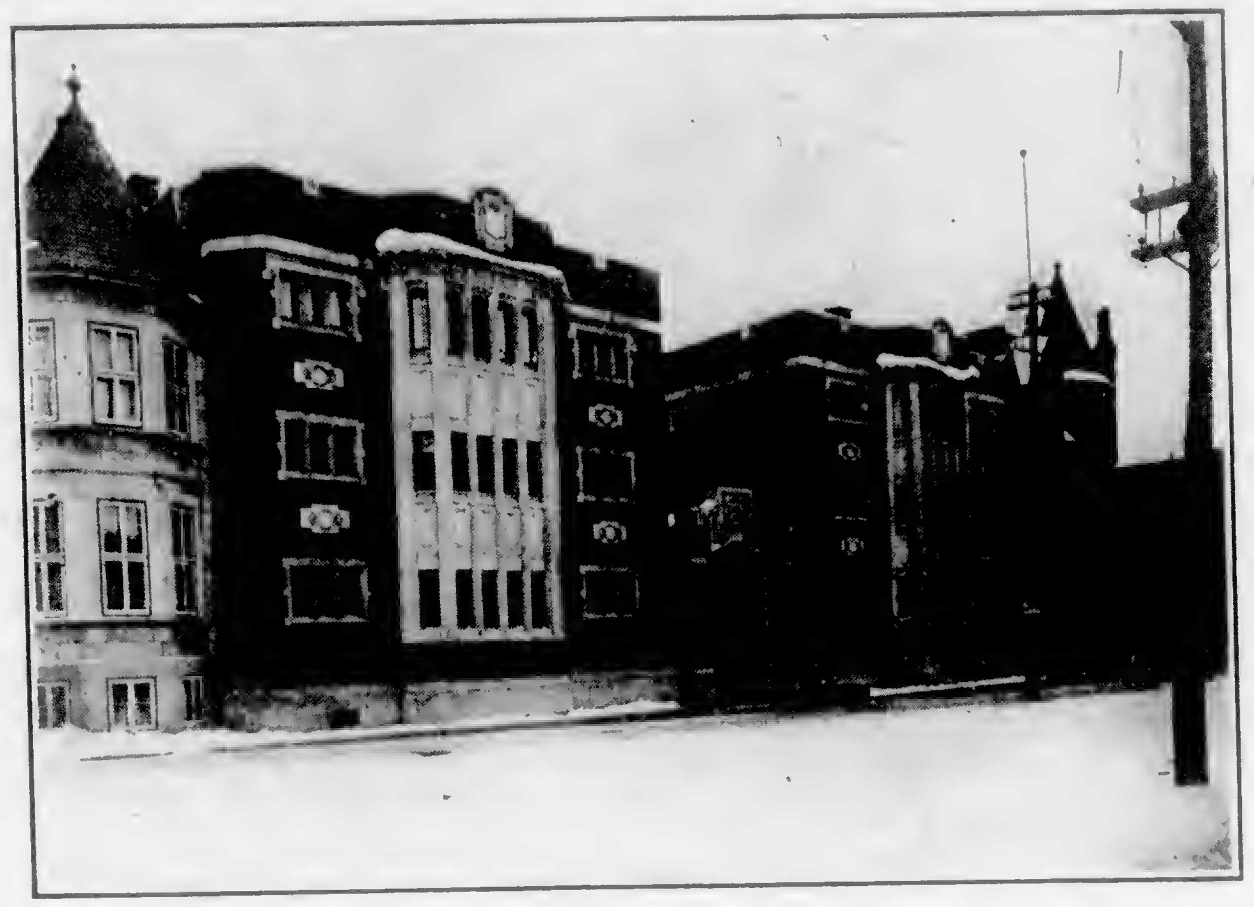


Rincon Building, San Francisco
Faced with Roman Stone *John C. Pelton, Architect*

But concrete in itself, while strong and efficient, is rough and uncouth in appearance and must be treated in various ways or covered with something in order that the structure may be presentable; and so there is felt the need of some suitable cement product that will serve this purpose while retaining all the good qualities of a concrete and combining therewith a pleasing appearance. Treating the surface of concrete, directly, either by plastering, floating, acid washing or similar devices has not proven very satisfactory, as the success of such expedients is contingent on numerous factors, as length of time forms must be retained, age of the concrete and climatic conditions. As a more successful alternative to this, there has arisen the practice of making the facing in separate pieces and setting it independently or in conjunction with the frame work of the building.



Bank Building, St. John's, N. B.
Built Entirely of Roman Stone *Darling & Pearson, Architects*



Apartment House, Montreal, Canada
Saxe & Archibald, Architects

Cement blocks are the oldest form of this practice, and while there are many, very many, machines for making these blocks, there are fundamental defects in the process itself that no machine, however clever or efficient, will eradicate, and which will always confide their use to small and unimportant buildings, where a monotonous repetition of form and color is less objectionable. Cement blocks are made by tamping or pressing a mixture of sand and cement, or gravel and cement, into iron or rigid wooden molds, under what is known as the "dry process," and the necessity of rapidly removing them from the forms, in order to make way for the next filling, necessitates this dry mixture, which does not at once supply the amount of water requisite to a complete crystallization of the cement. Subsequent sprinkling is always required, and it is doubtful if the cement ever becomes thoroughly crystallized, at least under the practical working conditions of this process. The product resulting from this "dry process" is porous, very absorbent and of a flat dull color, characteristic of the Portland cements. To obviate these defects, resort is sometimes made to "facing," that is, placing upon the exterior surface of the block a thin veneer composed of finer sand and richer in cement, and often colored. In some cases this practice has proven acceptable but where climatic conditions are in any way severe, the facing will crack, owing to the different densities of the block, and it is a difficult matter to secure a uniform distribution of color. Machine made blocks, being of a necessity more or less of a standard form and size, do not offer to the architect or designer any opportunity for the expression of his fancies.

Not so many years ago the question was being fiercely debated through many columns of our engineering publications, as to the relative merits of a "dry" or a "wet" concrete. Nowadays you will rarely find any up-to-date architect or engineer seriously advocating a "dry mix."

During the last half dozen years there has been in course of development a process of making concrete stone for structural and ornamental purposes, the product from which bears no resemblance in texture or appearance to the machine made cement block. The basis of this process is the casting of a wet concrete into a sand or other absorbent mold. That is the process invented and patented by Mr. Chas. W. Stevens.

The successful commercial operation of this method requires a larger outlay of capital for plant than does the cement block process, from the fact that the operator must be prepared to execute any design, even though it require a stone weighing several tons.

By this process the architect is given a free rein to his fancy. He may design what he will. All the manufacturer requires is working detail drawings, from which a wooden pattern may be made. The process closely resembles that of casting iron, for, the wooden pattern once constructed, from it one or any number of molds may be made in sand, into which is poured a liquid concrete. The basis of this concrete is not sand and gravel but a carefully selected rock which has been crushed and screened into various sizes and scientifically reproportioned and mixed with Portland cement. After filling the mold the excess water in the cast commences at once to exude into the surrounding sand, forming a wet covering to the stone, which is thus completely protected from the dry atmosphere for a period extending from four days to a week, while the cement, having all the water it requires, rapidly crystallizes.

The resulting product is very dense, being some 50 per cent heavier than stone made by the dry process, which means that it has much less absorption, and the water resisting qualities are not confined to a veneer at the surface but exist throughout the mass.

The color of this stone is uniform throughout and depends in large measure upon the rock aggregate and the brand of cement employed, and being thus homogeneous, it may be cut or hand carved in any manner that natural stone is treated. Made from a light colored rock aggregate, the product closely resembles in color and texture the limestones from the quarries about Bedford, Indiana. The companies operating under these Stevens' patents have developed machines whereby the stone may be tooled, after casting, and when so treated the product has all the life and beauty of natural stone, and would deceive any one not familiar with its true character.

The product has been called "Litholite" and "Roman Stone," though the latter name is undoubtedly better known, as the larger number of the companies operating this process throughout the Eastern States and Canada have registered that name for their output.

It is along the lines of this process that we may expect the fullest development of the concrete stone as a building material, since it closely approximates the method by which Nature has produced some of our best building stones, the deposition of a rock aggregate in water, and accomplishes in a few weeks by the aid of Portland cement, the binding of this aggregate into a solid mass, which Nature only accomplishes through long years of heat and pressure. The ease with which, by this method, any form may be executed in concrete, thus giving the architect an opportunity for the full realization of his ideals, has been one of the strongest factors in promoting the growth of this process.

* * *

Largest Steel Dome in the United States

IN OUR June issue we published an illustration and description of the splendid steel dome of the Emporium building, San Francisco. It was stated that it was the largest steel dome in the United States. That statement had perhaps better be modified to read "one of the largest." Upon a comparison of figures it would seem that the Chicago Post-Office building still holds the palm for mammoth proportions in steel construction. According to Mr. F. W. Fitzpatrick, our esteemed collaborator and frequent contributor to The Architect and Engineer, who was the designer of that dome and the assistant architect in charge of the building, its square base is 128 feet across. The construction is entirely of steel, but it carries a granite exterior shell above this base which is 94 feet in diameter and 64 feet high. The dome proper, covered with a gilded glass tile, is of the same diameter as the drum and 70 feet 6 inches clear above the granite work. The top of the crown is 302 feet above the street, above which again rises the tall steel flag-pole.

Incidentally, there are 600,000 square feet of floor area in this mammoth building, nearly 12,000,000 cubic feet of space and over 19,000,000 pounds of steel.

* * *

We never know who our real friends are until the lies of our enemies are denied by them.

Pitfalls in Practice

AN ARCHITECT, placed as he is, midway between client and builder, is more than most men subject to temptations, and liable to tumble into pitfalls, many of which are remarkably well covered up. If he would avoid them, he must walk circumspectly, not only all the day, but all his life long; although, naturally, it is in his early days that he is most likely to stumble. He owes it to his client to be competent, and to look after his interest in all respects; he owes it to the builder to be just rather than exacting; and he owes it to both to be strictly honest and true in all his dealings. The great thing with him, as with all men, is to avoid the first slip, however insignificant and paltry it may seem; for the first little diversion from the straight path is almost sure to result in the crooked road being followed to a greater extent as time goes on. It is the very insidiousness of many temptations, the fact that they appear at first sight to be quite little things, in which their danger lies. We all know, for instance, and we all exclaim against, the acceptance of commissions from any other person than the client; it is we believe, a thing which is now rarely done—publicy, of course, never—but even in secret, much less of it than there used to be; and those who were the greatest sinners in this respect in times gone by were probably led onward from very small beginnings. It is, for instance, a simple thing to accept a lift from a contractor when visiting works at a distance—there is, in fact, no harm in it, provided that the client is not charged for the cost of the journey. The difficulty is to know how to draw the line if, later on in the day, refreshments are offered. It may appear to be of little importance to accept sandwiches from the contractor's packet; but sandwiches lead to drink, and both may lead to a more substantial meal, and thus the habit may develop of accepting little courtesies, which are practically bribes, from very small beginnings. From these little things, it is no great step to accept small Christmas-boxes, and gifts of pieces of furniture or household fittings, and from these to money presents—particularly if they are disguised as loans—the transition is easy. How to deal with these things courteously as well as definitely is an art in itself, and a good many may well take a lesson from the old West of England architect who had a dispute with his builder shortly before Christmas, he having discovered that zinc nails were being used on a roof where copper nails were specified. On Christmas Eve he received a dozen bottles of port, with the contractor's compliments. Instead of returning them, or otherwise hurting the contractor's feelings, he waited till New Year's Day, and then sent the contractor a dozen of sherry with his compliments, and added, as a postscript: "You will have to use those copper nails."

The temptation to submit to bribery is, however, by no means the only pitfall in front of the young architect; it is in fact, the most obvious one, and, consequently, the most easily guarded against, whether the temptation comes from a contractor, or from a quantity surveyor, who offers to share commission or to act as the architect's assistant, and to prepare the quantities under the architect's name, and take only a small share of the commission which is charged in consequence of doing so. Much more subtle is the temptation not to do honestly every little thing for which payment is made. The first temptation of this sort to occur is perhaps the most difficult to resist—namely, that of producing a sketch plan which shows a much more elaborate and beautiful building than can possibly be carried out for the sum of money which is at the client's disposal, whilst submitting a rough estimate which would indicate that the cost would be well within the limit. Looked at in cold blood, this is obviously a dishonest thing to do; yet, possibly, nothing is more common, particularly with the younger men, who justify their action by saying that if they did not do so somebody else would, with the result that the work would be lost to them. As a matter of fact, this is no justification whatever, and, before very long, the dishonesty becomes apparent, and the client henceforth doubts his architect. It is an important thing to build up a reputation for trustworthiness, and nothing could militate against this much more than to deceive a client at the outset with regard to the cost of a proposed building. That particular contract may go through after alterations have been made to cut down expenses; but at the back of the client's mind there will always be the feeling that he had been deceived at the outset by one whom he trusted, that he had been led to expect that a much more pretentious building could be attempted for the money than was eventually proved to be in the least degree possible. Somewhat similar to this is the temptation to prepare the first rough sketches in too sketchy a manner, without giving a sufficient amount of thought to practical considerations, with the result that material alterations have to be made from the first sketch scheme when the working drawings are prepared. Such small matters as showing a staircase on plan so placed that somewhere there is so little headway that nobody more mature than a child of ten could get up it without stooping is quite undiscoverable by the average client; yet to correct the defect would, in all probability, mean the entire recasting of the plan. There are many other details of this sort which are apt to be too much neglected at the initial stage—doorways cramped in awkward corners, fireplaces so planned that a smoky chimney is inevitable, and the method of roofing ill-considered or unconsidered—involving all sorts of difficulties when the client insists on having the house built as planned, and equally objects to alteration in the elevation and to the provision of gutters in positions where they would surely leak. There are some occasions when sketches are asked for at such short notice that there is no time for these matters to be properly gone into; but, if so, the architect ought to clear himself from responsibility in the letter which accompanies his sketches, and leave himself free to make any alterations which maturer consideration may necessitate without stultifying his reputation.

A desire to do things in too great a hurry is quite common upon a client's part. He almost invariably expects contract drawings, and specifications and quantities also, to be prepared very much more rapidly than is possible if proper consideration is to be given to them. An architect who is anxious not to lose his client is apt to fall into this pitfall, which is a very real one, and well covered over, and needs a good deal of tact to avoid without offending the client. Enough time must always be demanded for preparation of workmanlike drawings, and for thoroughly considering every point, as otherwise the risk is run of a great deal of trouble later on. It is an architect's absolute duty to see that his drawings are complete and fully figured, and that they can be carried into execution as drawn, while it is equally essential that his specification should be complete in all respects, free from ambiguity, perfectly definite, and perfectly comprehensible. Any slips made at this early stage are sure to result in trouble afterwards, and very often an extra few days or a week spent by an architect upon his drawings and specifications will save money, time, and temper in the end.

The next temptation to the inexperienced man is that of being either too strict or too lenient with the builder, not holding the balance absolutely justly between him and the client, but acting either too much as a partisan on the one hand, or too little as the client's agent on the other. It is an architect's duty to see that everything is thoroughly sound and in accordance with plans and specification. If in excess of zeal he demands a higher quality of workmanship or material than is justly inferred, he is doing as wrongly as if, on the other hand, he allows excessively sappy woodwork to be introduced, on the builder's pleading that it is customary, and that such as was specified is costly to obtain. It is better, however, to be too strict than too lax; and it is better to be either, consistently, than to earn a reputation for indecision. An architect must, at any rate, know his own mind. If he is strict, builders soon get to know him, and price accordingly, and probably very few tricks are attempted; there may be some difficulties with the first few contracts, but there are few afterwards. The lax man, on the other hand, is much liked by the builders; but he provides for himself a great amount of trouble when, in years to come, his buildings display defects. The uncertain man is liked by nobody. He is neither trusted by the client nor the builder. The one is never sure whether his building will be sound, and the other never knows whether he is going to make a profit or a loss upon his contract.

Now and again an entirely different set of pitfalls spread themselves in an architect's path. He meets with clients, perhaps, who ask for a great number of preliminary sketches, and then throw them all over and begin again with another scheme. This is very trying to his patience, and possibly to his pocket also. The temptation is not to charge for these preliminary sketches, in the hope of eventually obtaining some work to do, and, in the end, it may well be that the commission received is utterly inadequate as compared with the amount of work that has been done. A great deal of that for which an architect is paid is shown on the preliminary sketches. It is in them that he displays his skill; it is in their preparation that he exercises talents that he has been at much pains to educate during the whole period of his pupilage and early architectural training. He is, therefore, as much entitled to payment for them as for carrying through a building, and when fidgety clients are met with who want sketch after sketch, it is only right to inform them of the position of affairs; but much tact is again needed in doing so. Now and again, though very rarely, the fraudulent client turns up, who never intends to build at all, but merely wasts an architect's time in preparing sketches, and sometimes completed drawings and specifications also, in order that, by their means, he may impress others with his stability and with the magnitude of the schemes which he has in hand. Each case needs to be treated separately, whilst their very rarity makes it almost certain that the architect will fall into the trap, and find himself put to great expense and trouble in preparing drawings for no purpose on behalf of a client who is utterly impecunious. As a rule, the only thing to do is to put up with the loss. It would be only throwing good money after bad to take the matter into court, while the advertisement which an architect would receive by doing so would scarcely tend to his advancement—a reputation for gullibility not being one which it is desirable to establish.— The London Building News.

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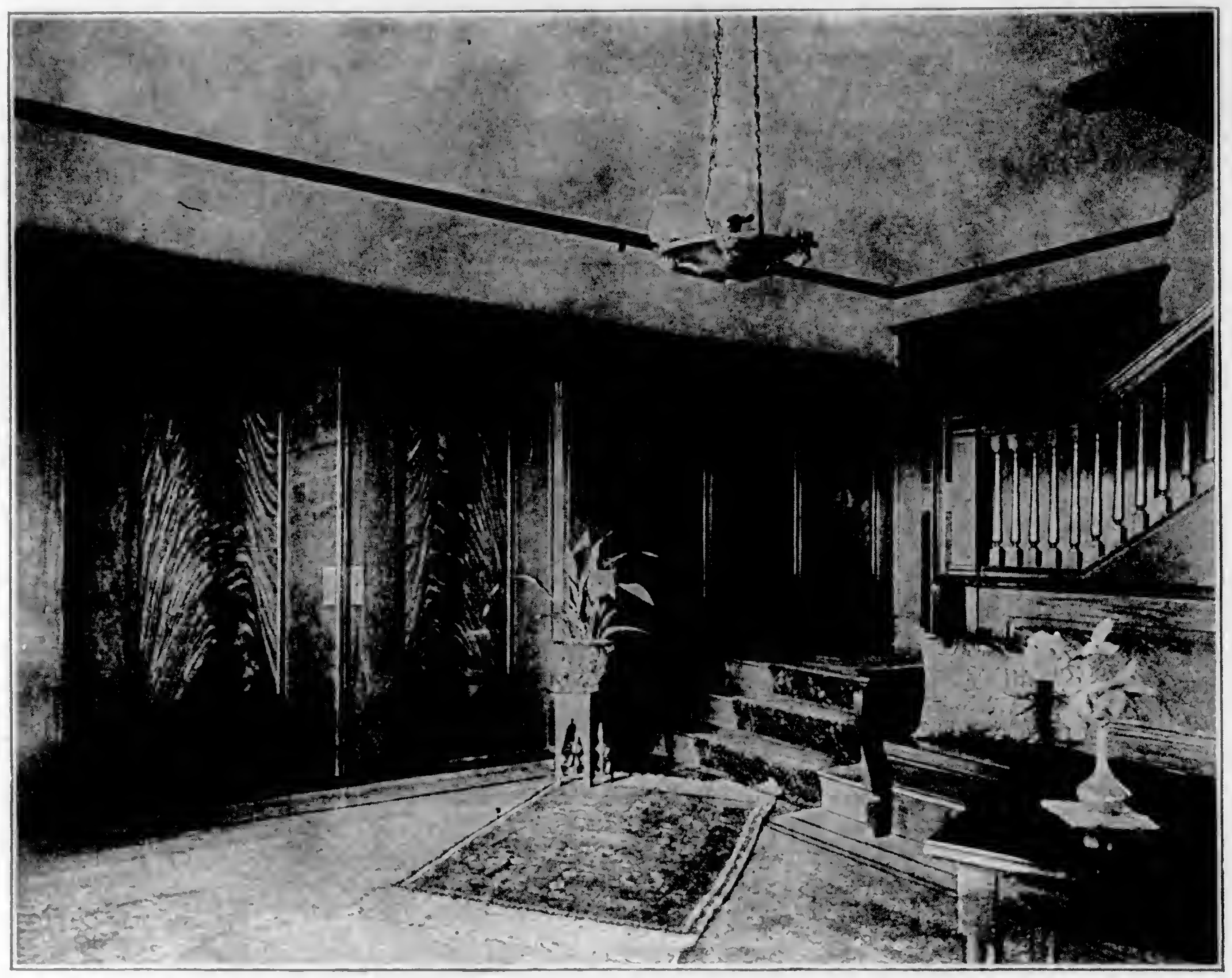
When times are dull and people are not advertising is the very time that advertising should be the heaviest. Ninety-nine out of every hundred merchants advertise most when there is least need of it, instead of looking upon advertising as the panacea for their business ills.—John Wanamaker.



Staircase Hall, Paneled in Crotch Mahogany

The Possibilities of Hardwood Panels for Interior Decoration

By E. A. HOWARD.*

THE possibilities in the use of beautiful hardwood for interior decoration are just beginning to be fully appreciated. Tapestries, wall papers, fine rugs and draperies have all been recognized and utilized. The material, however, which was nearest at hand and which is least artificial, namely, beautiful woods and the pictured effects which Nature has painted in the trees, has been neglected. It has remained for the revival of one of the oldest of the cabinet maker's arts, namely that of veneering, and the application to it of modern methods, to stimulate the use of beautiful woods, and to point the way to newer and greater possibilities.

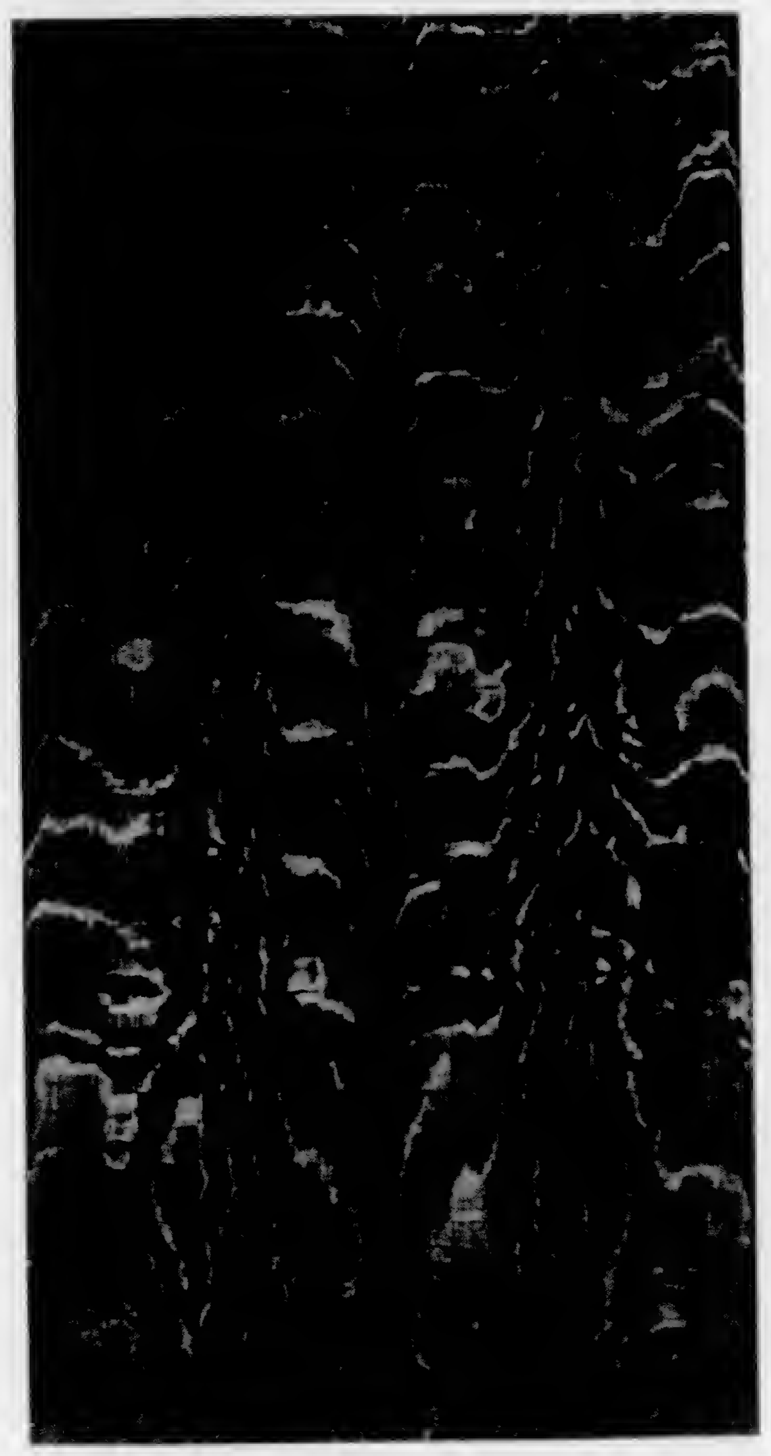
The arguments for hardwood trim are beauty and permanency, offset by the item of cost. To popularize hardwood trim, therefore, the cost should be reduced, the beauty enhanced and emphasized, and the permanence and stability of the wood increased. These are the aims which the panel manufacturer is striving for today, and is achieving in no small measure. Effects that were impossible before are today easily obtainable, and fine interior trim, both beautiful and permanent, is more easily in the reach of the modest home builder than the wealthy man of a decade ago.

In selecting this stock for panels only the most beautiful wood can be utilized. Even in woods that are noted for their beauty it is only the occasional log that has surpassing beauty of grain and figure. This log is taken for veneer, and by cutting it very thin is made into a great many faces. The plainer stock is used for less conspicuous purposes.

Again, it is only in large surfaces that beautiful woods can properly be shown. Solid wood, even if it could be secured in large uniform pieces, would not stay in place, but would warp and shrink, hence the natural way to secure these large surfaces is by building up the wood and crossing the grain so that all tendency to warp, shrink and split is removed.

The old method of veneering is wasteful, expensive and slow. Modern methods are effective, economical and rapid. Standard sizes are accepted. Cores and faces are all cut to size without waste. Stock that would otherwise be of little value is used for cores and backs. While under the old method a few panels would be made up at a time, now many thousand pieces are manufactured at once. The cost is thus reduced to a mere fraction of what it would be under the old methods.

Circassian Walnut



Quartered Oak

While uniform sizes are accepted in manufacturing, to permit of the greatest economy in construction, at the same time the units are plastic and not rigid, and may be worked and altered to conform to the taste of the individual or the demands of the architect.

Not the least of the advantages of the present method is that the consumer may see and select his woods before they are installed. He can thus know beforehand what they are going to look

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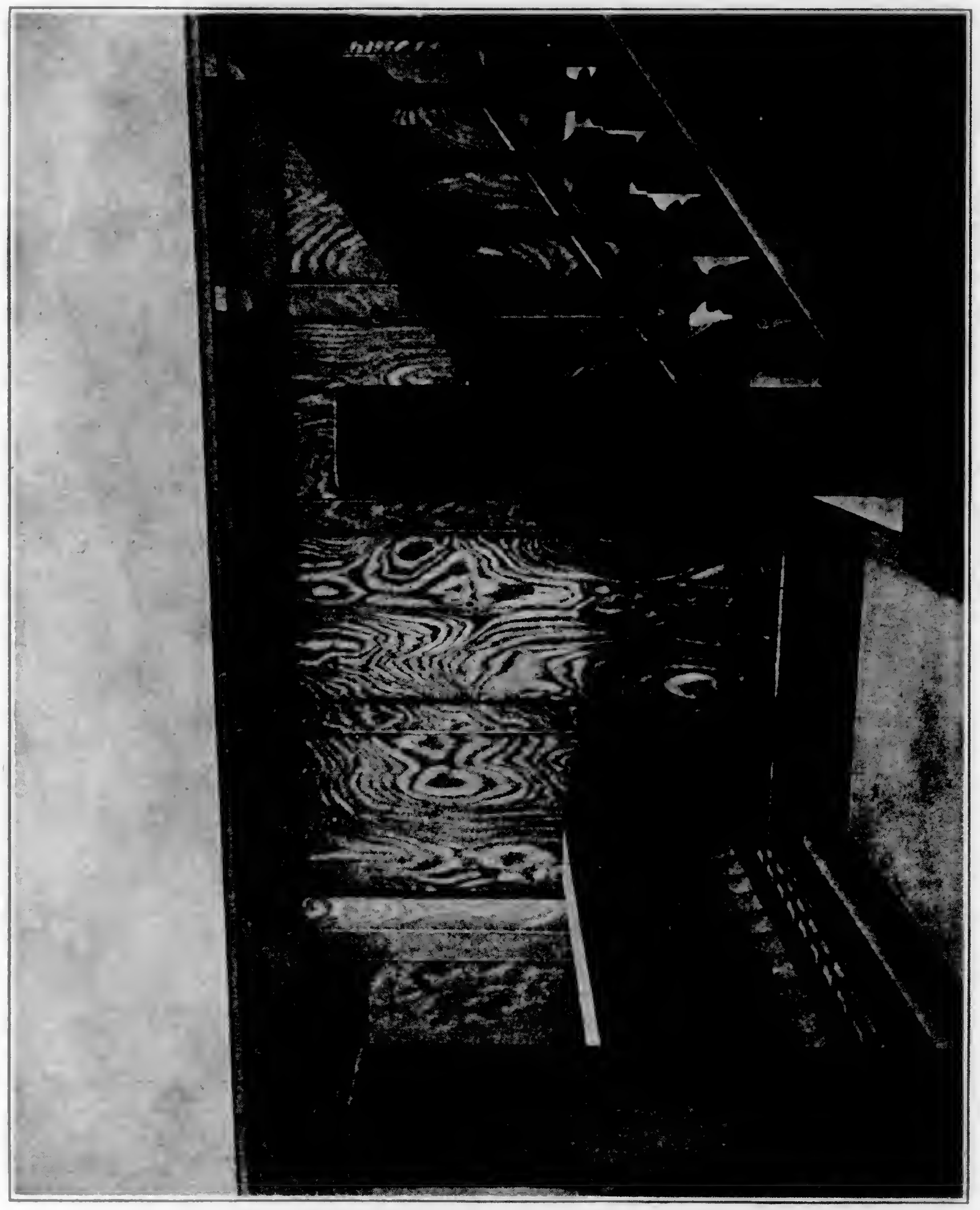
* Mr. Howard is president and general manager of E. A. Howard & Co., hardwood lumber dealers, 20 Howard street, San Francisco.

STAIRCASE LANDING in ASH PANELS and PINE TRIM



Dining Room Paneled in Quartered Oak

like when installed. The panel surfaces are chosen from the dealer's stock much as a tapestry or wall paper would be selected.

When it comes to the matter of installation the greatest economy is effected. No expensive mill bid has been necessary. The panels are finished, sanded, and ready to install. The stiles and rails or moulding, which holds them in place and which forms the finishing part of the trim, may be secured already run, and may be furnished by the mill. Any clever carpenter or contractor can put up the work, and if need be alter the design or plan if the owner wishes while it is being installed. In this way a beautiful trim may be easily built into either the new or the old home, and not least of the beautiful effects that may be obtained should be mentioned the easy and inexpensive way in which any old and unattractive door may be converted into a most attractive flush door by simply facing it with a full-size panel.

* * *

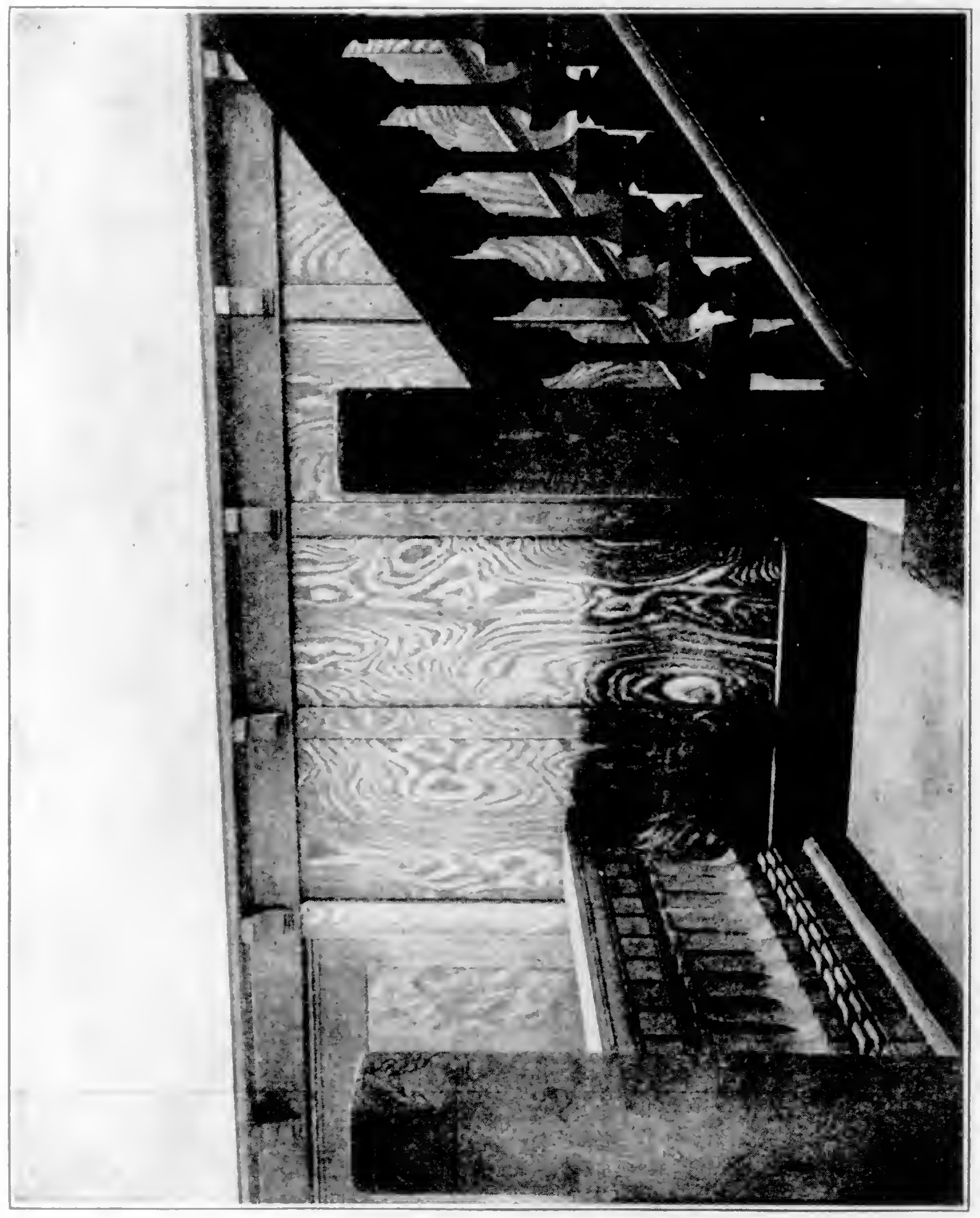
An Unfortunate Misunderstanding

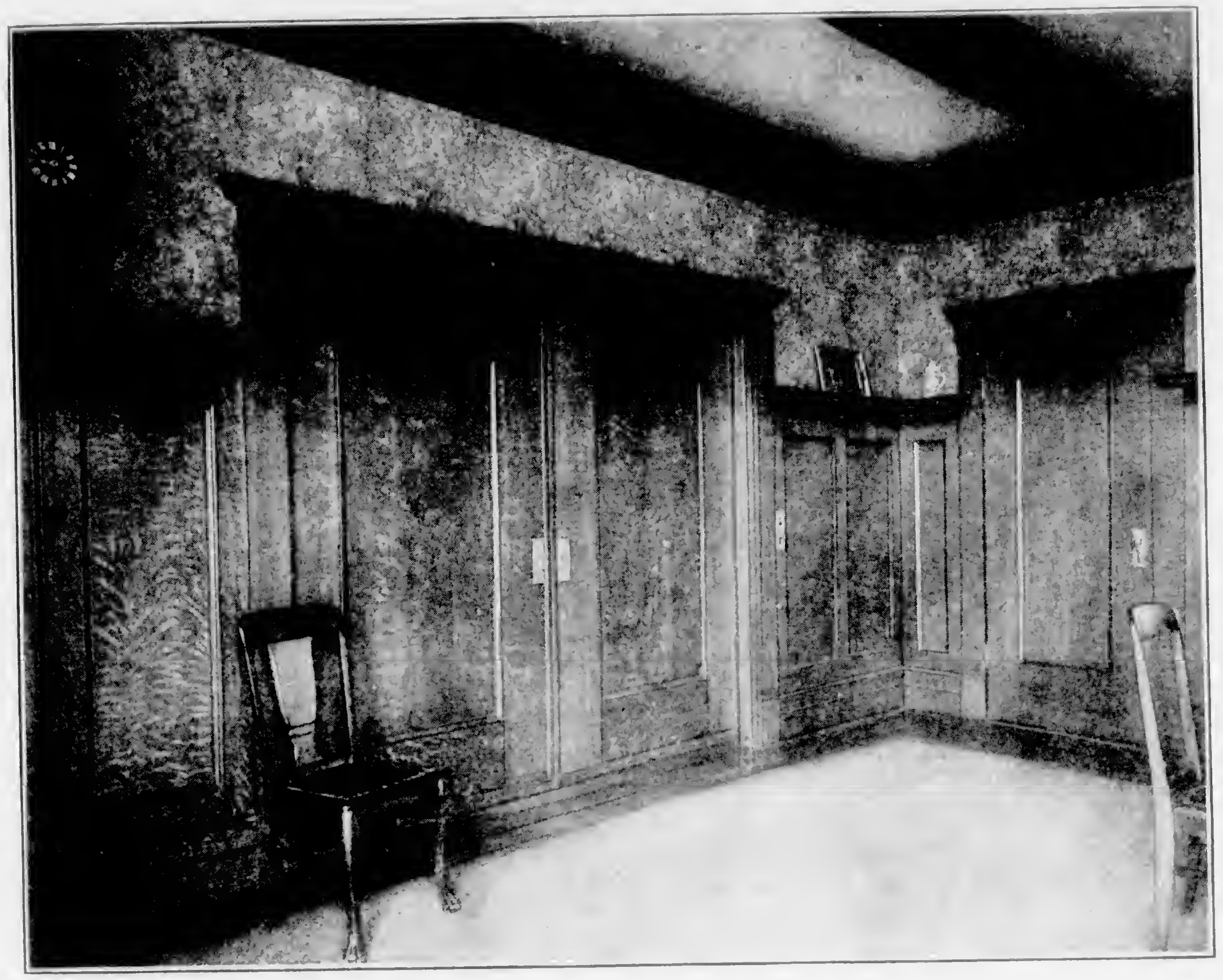
"I had to leave my last situation because the missus said they were going to lead the sinful life, and they wouldn't want any servants about the place."—Punch.

* * *

A boss always on time in the morning will do more than a time clock to prevent tardiness on the part of workmen.

STAIRCASE
LANDING
in
ASH PANELS
and
PINE TRIM





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* * *

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Among the Architects

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May Hold Competition

The San Francisco Supervisors have in mind a competition among the architects of that city for a new Hall of Justice and a $2,000,000 hospital. The plan is to select ten competent architects to prepare designs for a $1,000,000 Hall of Justice building and allow each architect $500 for his services. The same scheme will be worked out in connection with the hospital plans, only each of the ten competing architects will be allowed $1,000 for his efforts instead of $500. After all plans are in it is proposed to select the one which meets the approval of a special board of award to be composed of the city architect, a member of both the police and fire commission, the mayor and two supervisors.

As there are from fifty to one hundred architects practicing in San Francisco, the task of selecting the ten competing ones without causing bad feeling on the part of those overlooked is likely to be a very difficult one.

Engineers and Architects

About sixty members and invited guests of the Engineers and Architects' Association of Southern California visited Santa Monica on July 18th to inspect the construction of the new reinforced concrete pier and the plant for the electrolytic treatment of sewage.

The party was conveyed by special car to the site at Colorado avenue. Santa Monica. The members were received by Alfred Morris, president of the city council, City Engineer T. H. James and Engineer Edwin H. Warner, the designer of the pier and under whose supervision the work is being carried out. The visitors were shown the reinforced concrete piles and their method of construction which was described in the July number of the Architect and Engineer.

The contract for the construction of this pier was let last March to the Stutzer Cement and Grading Company and is estimated to cost $100,000.

Personal Mention

Architect Herman Barth is the latest member of the San Francisco profession to go abroad. Mr. Barth expects to spend several months visiting his old home in Germany.

Architect Hays is now a member of the firm of Howard & Galloway, architects and engineers, 604 Mission street, San Francisco. The firm recently completed the plans for the new $600,000 library building for the University of California at Berkeley.

Talked on Ventilation

William Scharnweber of Seattle addressed the members of the Portland Architectural Club recently on "The Importance of Ventilation." Mr. Scharnweber is a leading authority on this subject, having spent many years investigating it and has invented several appliances for securing good ventilation. He said that physicians as well as architects are woefully ignorant upon the subject of ventilation, considering that the only necessity in securing ventilation was to introduce cold air into the room, whereas cold air as often contains as many impurities as warm air.

Mr. Scharnweber was entertained at the Commercial Club by E. E. Gilmer, who had as his other guests the officers of the Portland Architectural club. A dinner was given to Mr. Scharnweber by the Portland Architectural Club at the Hotel Nortonia last evening. Among those present were Messrs. Joseph Jacobberger, R. J. Grace, John G. Wilson, F. J. Berndt, Joseph Gripper, Albert E. Doyle, F. T. Webber, E. E. Gilmer, E. B. MacNaughton, H. E. Raymond, Emil Schacht, E. Kroner and Herbert B. King, of the Architect and Engineer.

Stockton Y. M. C. A. Building

The plans for the $75,000 building for which funds were raised by the Young Men's Christian Association workers have been completed by Architect Walter King, 242 E. Main street, Stockton, and work is soon to be commenced on the structure, which will be one of the finest in the interior of the state. The building will cover a lot 75x100 feet and will be four stories high with a basement, the first story to be five feet above the ground. The new Stockton Brick Company will probably supply the brick.

Dissolve Partnership

Berg & Lampe, architects in the Metropolis Bank building, have dissolved partnership. Mr. Berg will continue to occupy the office of the old firm, while Mr. Lampe has engaged a suite of offices on the fifth floor of the same building.

Industrial School

Architect F. S. Allen, 301 Slavin building, Pasadena, is preparing plans for an industrial school building to be erected at San Bernardino. Bonds to the amount of $35,000 for the purpose have been voted.

Portland Notes

Good progress is being made on the new grandstand of the Country Club at Portland, Ore. The pavilion is of concrete and steel throughout, and the dimensions are 300 by 60 feet. Although the structure is to be a massive one, with a seating capacity of 2550, Chairman Campbell figures that it should not require more than six weeks to erect the stand. The grandstand when completed will be the finest on the Pacific Coast, and will seat 3500 people, and, being situated 50 feet above the race course, will give a fine panoramic view of the entire country for miles around.

The following Portland architects have changed their offices: Joseph Jacobberger has removed to the Board of Trade building; E. M. Lazarus is in the same building; H. J. Hefty is now located in the Gerlinger building, and H. C. Dittrich has offices in the Worcester block.

Messrs. Claussen and Claussen, architects, have moved from the Buchanan building to the new Board of Trade building, Portland.

Among the architects who suffered by the fire in the Abington building in Portland the past month were J. L. Morgan and J. O. Wrenn, both architects losing a number of plans and sketches of value.

Los Angeles Architects

Architect C. H. Russell is making the working drawings for the Exhibition building to be erected on Windward avenue, Santa Monica.

Architect John C. Austin has moved into a fine suite of offices at 1014-15 Wright & Callender building.

Architects C. F. Skilling and Otto H. Neher now occupy quarters at 601 Pacific Electric building.

Architects Maginnis & Walsh, 424 Citizens National Bank building, have finished plans for a frame Catholic church to be constructed at Fort Yuma, Cal.

Architect R. B. Young had a narrow escape recently. While alighting from a street car near his Santa Monica residence he made a misstep and fell, striking his head on the curb.

Architects Bixby & White, San Fernando building, are making plans of a large residence to be built on Tenth street, Riverside, for Dr. Brown, surgeon for the Santa Fe Company. It will be of the colonial style of architecture, and contain twelve rooms.

It is the steady gait all day that counts for most—provided the gait is not too awfully slow.

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COMPETITIONS

The truth of the old adage "History repeats itself" is well exemplified by the outcome of the recent Pittsburg High School competition, in which a number of prominent architects participated. Whether the plan devised and acted upon by the building committee and board of education, which resulted in the elimination of all architects who took part in the original competition, and the subsequent selection of a favored outside architect, will finally prove efficacious remains somewhat in doubt. There can be no doubt, however, as to the impression created upon the architectural profession and the public by the board's refusal to ratify the report and recommendation of its professional adviser, whose ability, judgment, probity and experience are beyond question. Whatever the outcome, it may be said that the reputation of the board will scarcely be enhanced by its action in connection with this lamentable affair, nor can the popularity of competitions for public buildings be expected to increase greatly as a consequence of it.

The more we hear of competitions the more we are convinced that there is nothing in them except trouble and expense for the participants.

In Portland, Ore., general dissatisfaction is said to exist among competing architects as to the methods employed by the Board of Education in awarding the prizes for the designs for the new High School building, to be erected at a cost of $250,000. After making its own provisions in writing, the board is accused of disregarding them, and of doing so in a manner indicating that its intention was to prevent the architects themselves, as well as the general public, from learning the facts.

In San Francisco the Union Trust Company recently held a competition, and although one of the contestants was awarded first prize by the committee, the directors of the bank gave the work to another architect whose plans had received second mention. And so it goes. After a while architects will refuse to go into competitions except with the understanding that the rules of the A. I. A. are to be followed to the letter.

SIZE OF BUILDING

Some of the architectural journals and the New York dailies in commenting upon the great post office building just planned for that city, and awarded in competition to Architects McKim, Mead & White aver that it will be the biggest post office building in the world, as it will contain 114,375 square feet of floor area, and add that London comes next, with a post office having 101,000 square feet of floor area. These editors must either be misinformed as to the exact size of the proposed new building, or they have forgotten Chicago's mammoth structure that we have always supposed was the largest building of that character in the world, which belief is further strengthened if the figures given for the New York building are correct. The following interesting data about that great monument has been given us by its designer and deputy architect, Mr. F. W. Fitzpatrick, now of Washington. The post office proper contains 344,106 square feet of working space, plus 25,000 feet of public corridors, but serving the post office divisions. The total floor area of that building, including all the courts and other offices of the government, as well as the post office equals 600,000 square feet, of which 550,000 is working space. There are 11,908,000 cubic feet of space and the building cost 40 cents per cubic foot. The old building it replaced had cost nearly 60 cents per cubic foot. The Library of Congress cost 63 cents and most of the other great monumental buildings have cost over 50 cents so that Chicago's is not only the biggest but the most economically built structure of its kind in the country, spite of its having passed through many vicissitudes. Incidentally there were 460,000 cubic feet of granite used in its construction and over 18,000,000 pounds of steel.

THE REAL FIRE DANGER

The New York Board of Trade has taken a reasonable view of the fire situation in that city and is at work upon the authorities to compel that all new buildings be made fireproof. The Board of Trade takes issue with the Board of Fire Underwriters in the latter's alarm anent the danger of fire originating in the tall buildings. The Board of Trade's experts realize that the real danger lies in the great mass of shoddy and old buildings all about the city and urge that these be eliminated as fast as possible. The skyscraper, with its outer walls of brick and terra cotta, its steel frame thoroughly encased in fireproofing tile and its elevators and stairs enclosed and windows protected with wire glass, is absolutely immune as far as the structure itself is concerned, and if the Board of Trade's recommendations are carried out and adequate provision is made internally in these tall buildings, their contents will be equally immune and there will never exist the slightest possibility of fire originating in or spreading from these tall buildings.

San Francisco Chapter, A. I. A.

At a recent meeting of San Francisco Chapter of the American Institute of Architects a discussion was held relative to the work of the State architects. It was the concensus of opinion that legislative action is desirable looking to certain amendments of the present law which provides for a state architect and gives him full charge of all state work. It is felt that there is too much state work for one official to attend to and that competitions should be encouraged, the state architect to act more in the capacity of a supervising architect, than a designing architect. The fact that the state architect is also seeking private work is another matter that the Chapter is anxious to have attended to by the next Legislature.

HEATING AND LIGHTING

Material Arranged by Carl E. Roesch, Edwin B. Pike
and Wm. E. Leland, S. B.

"The Illuminating Engineer"

Arranged by Carl E. Roesch,
of the Enos Company

THE question of artificial illumination has received so much serious consideration during the past few years that the term "illuminating engineer" is being received with the degree of consideration and respect it deserves and the services of the man with the necessary ability to wear the title are being eagerly sought after.

In view of this it would be wiser for those interested in the proper installation of artificial lighting devices to give this phase of their business a little more careful consideration. It does not mean that one must necessarily be a graduate engineer of a school of technology, for with a good grounding of the fundamental principles of illumination, leavened with an abundance of sound sense remarkably good results can be accomplished.

The ever increasing variety of reflecting shades and accessories and the remarkable development of the new types of incandescent bulbs offer possibilities for a more careful consideration of certain vital factors which enter into the proper illumination of given areas than was ever before possible. Some of these factors are:

"A"—Where outlets should be placed.

"B"—What sort of lamps give certain results.

"C"—What types of globes, reflectors, or shades should be used to secure the desired distribution of light.

"D"—What sizes of lamps to use, as to candle power.

"E"—How high they should be placed above the objects to be lighted.

"F"—Proper consideration of color values.

"G"—The decorative importance of the lighting instrument.

The proper amount of thought given to the above subjects would be productive of much more satisfactory results than are now possible with the haphazard manner of making installations.

It is quite apparent that the knowledge necessary to properly dispose of these points is rather one of knowing what results are produced by the use of certain types of lamps or glassware rather than a technical knowledge of the number of foot candles necessary to light a certain given cube.

It is the careful consideration of these common-sense points which defines the "illuminating engineer" from the "electrical engineer."

To discuss in detail each of the above mentioned subjects would mean a paper of considerably more thoroughness than this is intended to be, but there will appear in this department each month articles treating of the new electrical devices which enter into it, as well as discussions of the subject in a general way.

The Origin and Use of Louis XIV Fixtures

By G. W. Pearce,
In "The Illuminating Engineer"

FEW in the fixture business at home or abroad know who was the originator of the Louis XIV. school of design in metals. It was Charles Perrault, born at Paris in 1628, died at Versailles in 1703. He designed and modeled all the exquisite lighting fixtures at Versailles and at the King's palaces in Paris. Much of this work is intact, and is the joy of artists.

Many of Perrault's fixtures exhibit cupids and cherubs holding torches, torch extinguishers, and branches of acanthus formed into candle holders and to serve as brackets, sconces, girandoles, newels and chandeliers. A study of the faces of the cupids and cherubs shows them reflecting all the emotions of children. Perrault modeled these faces from his own children and from those of the nobility at the court of the Grand Monarch, Louis XIV. To obtain the emotional effects of joy, mirth, hope, eagerness and other in-

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fantile emotions in his models, he invented and told them fairy stories and composed rhymes and little songs which, when published, became the possession of all peoples; they are living in all languages. What did he compose? Here is a partial list: Little Red Riding Hood, The Sleeping Beauty, Patient Griselda, Cinderella or the Glass Slipper, and last, but by no means least, the immortal Mother Goose Melodies.

That gay, swinging, martial and rollicking song, "Malbrouck," was composed by Perrault for the entertainment of some of his models, the children of a great general of the French Army, with whom Perrault had served as an engineer in a campaign against that valorous English general, the Duke of Marlborough, whose name the French then and now pronounce Malbrouck. On a battlefield Perrault had picked up a letter from Sarah, Duchess of Marlborough, to her husband, scolding him for staying in camp in France during a truce, while she pined for him at Dover Castle. Of this incident Perrault made the song which is still sung throughout France, where to this day many a child that is fractious is frightened to bed with the tale that "the terrible Malbrouck is coming."

The present Duchess of Marlborough has an exquisite collection of gold gilt Louis XIV. candelabra made in this country with remarkable fidelity to the expression of the cupids and cherubs portrayed from the French marshal's children, for whom Perrault composed the stirring words and music of "Malbrouck." Washington was so fond of this French song that he had it arranged for the field instruments of his headquarters' band. He delighted in hearing it sung with a thundering chorus by the army of Rochambeau, whose mother had sat as a child to Perrault for one of the cupids with a torch. This fixture was modeled for the grand salon in which, many years afterward, the treaty of peace was signed between the King of Great Britain and the Thirteen Colonies.

Mr. Edison Will Visit the Northwest

Mr. T. A. Edison took a party of 150 personal guests on a special train, on July 18th, to the works of the Edison Portland Cement Company at Stewartsville, New Jersey, when a thorough examination was made of the large and interesting plant which embodies many of Mr. Edison's inventions as applied to the art of cement manufacture. Luncheon was served on the train, and fine weather helped to make the excursion a most delightful one. The party included many of the leading architects and contractors of New York City, and a number of prominent engineers and educators. A hearty cheer was given Mr. Edison when the train stopped on the return trip to let him off at Orange. Mr. Edison was in remarkably good health, but to ensure thorough restoration of strength and to escape the heated spell, he is now going to spend six weeks with his family in the Northwest, proceeding as far as Vancouver.

The Warm Air Furnace vs. the Fireplace

By an Old Timer

I

> "The man who whispers down a well,
> About the goods he has to sell,
> Will never reap the shining dollors
> Like he who climbs a tree and hollers."

As FRESH as the breeze warmed by the sun of the new day, every month comes the Architect and Engineer, full of life and new ideas, as expressed by your various contributors, and as your columns seem open to all well-behaved, who have anything to offer that will benefit owners, architects, or contractors in the construction of buildings, I venture to offer you a series of articles on warm air heating. With goods to sell, I shall treat this subject in an entirely impersonal manner, with the full hope that it will benefit every one else in the building business, as well as the writer, and lead up to a better class of work along the line of warm air furnace installation. It is an old maxim and true, "If you help your neighbor, you are bound by natural laws, to help yourself."

A few days since a man came into our office with plans for a residence, and stated that he was an Eastern man, and knew the advantages of having a properly installed warm air furnace, but was up against it because of the fact that he did not have money enough to install the furnace, or if he installed a furnace he would have to leave out his plumbing fixtures. We told him that we regarded a first-class heating apparatus in his house as necessary as the plumbing fixtures; also we did not see how he could live without his bath tub and other toilet appliances in connection with the plumbing, but in looking over the plans of his house, we had a suggestion to make, which might enable him to have both, and not increase the cost of his house. In the plans three fire places were shown, and we asked the man, "What do you want with so many fire places?" The reply was "I do not think I will be able to put in a furnace at the present time and must have some way to warm the house" (yet at the same time he expressed the idea that two of the fire places were really in the way). We asked him to see his architect and contractor, and find out how much they would deduct if two of the fire places were left out of the building. The next day the gentleman returned and with the saving made by leaving out two of the fire places, he was able to install a first-class warm air heating plant, and have money left. While touching the subject of fire places, we do not wish to injure the man or men who build fire places, yet we could not refrain from giving this instance as an example whereby others might profit.

* * *

At best a fire place is usually considered an ornament, but unlike a piece of furniture, the house wife cannot rearrange it, but must leave it in the same place. The hearthstone, with its blazing logs, has been a theme for poets (and also a source of dirt and dust), and we suppose some of the expressions connected therewith

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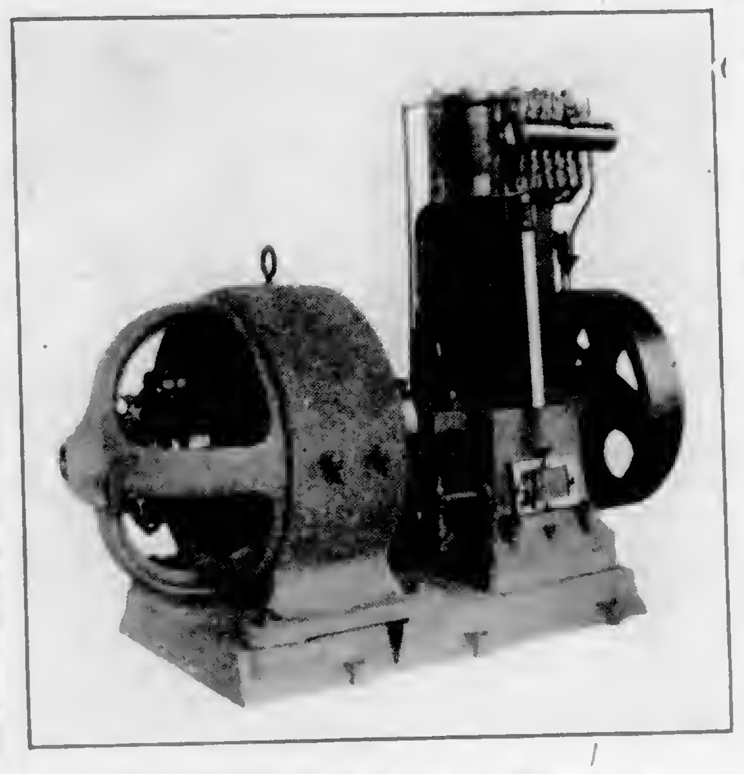

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could be traced back to pre-historic days, to men who gathered around the fitfull blazes of their camp fire, extracting what little comfort they could therefrom, and because their camp fire was so much better than nothing, it fulfilled their every idea of comfort and that idea has been so deeply implanted into us that we still think there is nothing like the old fire around which to gather of an evening. Sentiment may be a beautiful thing, but to the man who is building a house the dollar usually cuts a figure and he must obtain for his dollar just as much comfort and utility as it is possible to get. A properly installed warm air furnace will, with the same amount of fuel used in a fire place or heating stove, warm the whole house to an even temperature, whereas the fire place or stove will at best only warm one or two rooms.

In one of your late issues we have noticed particularly a design for a modern bungalow, with the usual plumbing fixtures, which are considered necessary in the modern house. Every provision seems to be made for the comfort of the inmates, with the exception of heating. We all agree that heat is a necessity even in our Pacific Coast country, and in the case of the house mentioned, provisions are made for one fire place in the living room, leaving the dining room, bath room, and bed chambers with absolutely no provision for warming. Such a house might be ever so nicely arranged in every other particular, yet you could not be comfortable without heat, and the arrangement of this house is such that about $200 expended would put in a first-class heating plant. We venture to suggest that the mantel and fire place would cost at least that much. We are not writing these articles with the idea of eliminating altogether the fire place in the modern residence, but with the idea of showing the desirability of a modern heating plant in the residence.

* * *

In building a house there are three kinds of heating which are usually considered by architect and owner, hot water, steam, or warm air. For this climate especially, warm air is certainly the most desirable for residence purposes, for the reason that quicker results can be obtained, or in other words, heat is usually wanted in the mornings and evenings and wanted quickly. With a properly constructed warm air furnace, the ordinary house can be warmed in from 15 to 20 minutes from starting the fire, and can be controlled absolutely as to the amount of heat furnished, whereas with hot water or steam it takes from 30 minutes to one hour to establish a circulation sufficient to warm the building, and especially with hot water, the radiators will remain hot during the middle of the day, when heat is not wanted.

Radiators necessary with hot water or steam are very often a nuisance on account of the space they occupy, while with modern methods of installing warm air furnaces with especially designed registers they can be placed in walls, and occupy no space to interfere with the arrangement of the furnishings of the house. In future articles we will take up and show what constitutes first a properly constructed furnace and following them, examples for correct installation and arrangement of same.

———

A Luminous Clock

The Eiffel Tower in Paris is now being used for another practical purpose. On the sides of the second section, hundreds of feet above the ground, a luminous clock warns the gay Parisian of the passing span of life. The apparatus flashes forth every minute in huge figures visible a great distance. This system

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was found the only practical one, as the ordinary clock dial would be indistinguishable at such a height.

Praises Coast Business Men and Their Enterprise

Mr. H. L. Balch, secretary and treasurer of the Reliance Ball-Bearing Door Hanger Company, 1 Madison avenue, New York, recently paid a flying visit to the Pacific Coast for the purpose of appointing local representatives for his company.

While in San Francisco Mr. Balch called at the office of the Architect and Engineer and said he felt much impressed with what he had seen while in the West, and that he could not refrain from expressing himself concerning the conditions as he found them in the building field.

"First of all," said Mr. Balch, "I must congratulate the people of the Coast for the fine feeling of hospitality which seems to characterize their actions in every walk of life. I never was treated so hospitably and cordially in my life as I have been in my short stay here. I had always heard of this free, openhearted manner of the West, but I never realized before what it meant. And before I leave I want to say that I thoroughly appreciate the kindly things that have been done for me while here. In the East, especially New York, it is all so different, and in spite of the quick, decisive method of doing business in New York, I cannot see that the business men of the Coast are behind in this respect, but somehow they seem to find time, and take the trouble to inject a little personal note of hospitality and cordiality into their business relations with each other. I wish it were this way in New York.

"Aside from this pleasant characteristic, I cannot help but feel impressed with the remarkable energy and courage with which the men here have tackled the problem of rebuilding San Francisco. The great progress that has been made thus far is a wonderful surprise to me. I had read, of course, a good deal about the work going on in this direction, but did not dream of finding a city half rebuilt after a great disaster.

"We are accustomed to seeing big things done in New York on short notice, and we take a little pride in the reputation we have acquired for hustle and enterprise, but I really can't see where we have anything on San Francisco in this respect. In fact, if it weren't for appearing a little disloyal to my home town, I would say that you are showing a hustle and pluck here that we can't match in New York. And if it can't be matched in New York, I don't know where it can be equalled.

"Another thing that looms up to me is the great future of this section. Everywhere I go here, I find the people so full of the fire of ambition and so firm in the belief that the Coast is on the eve of outstripping the East, that I have fairly caught the spirit myself and firmly believe that the next generation will find the scenes of America's supremacy rapidly shifting to the Coast states.

"The other day a man told me that the Panama Canal was going to work wonders for this country, and then he went on to tell me all about it. Then he told me of the great growing trade of the Orient, the development of Alaska and British Columbia and the great resources that lay buried at your backdoor here, until he got me all aglow with the prospects of your future. I believe that this man is right.

"Another feature which appealed to me immediately as I began to go among you, is the character of the people who make up the great bulk of your population. You seem to be all thoroughly American. This is particularly noticeable to a man from New York where a large bulk of the population is foreign, and where a large and great minority do not even speak the English language. I will certainly carry back with me a most favorable impression of this country and the people that run it, and I am exceedingly glad that our company decided to send me here to look over the situation and arrange for local representation. My only regret is that we did not do this before, for I feel that a great deal of business and a fine opportunity has been overlooked. Our hangers have become thoroughly established in New York and the East generally.

"More than eighty per cent of the largest buildings erected in New York within the past two years are equipped with our hangers, and I see no reason why we cannot obtain as much business from this section within the next two years, as we obtained in the East."

Mr. Balch called on several architects and builders while in this city and appointed Mr. Victor Dunkerley his company's representative in San Francisco, Mr. Louis R. Bedell, in Los Angeles, D. E. Fryer & Co., represents the company in Seattle, and Portland Wire and Iron Works in Portland, Ore. These agents all have a full line of samples of the different style hangers manufactured by the "Reliance" Company, and will be pleased to explain the construction and workings of the hangers to any persons interested.

Indifferent Heating Jobs

Our attention has been drawn to the number of indifferent steam and hot water heating jobs done in the city of Winnipeg, says the Western Canada "Contractor." Architects and builders alike say that these are good and bad. Upon inquiry we learn that this is not the fault of the apparatus, pipes, boilers or radiators so much as it is the fault of the heating and plumbing contractors who ought to know their business better or employ someone who does know it better.

The constant trials and tribulations of the architect, or the builder, who gives the sub-contract for the proper heating required are not at all necessary.

A little further inquiry upon the part of those who want good heating jobs should result profitably to everyone except those guilty of installing poor hot water and steam heating and plumbing.

In the above lines, as well as in the hot air heating line, there is a lot of apparatus which we believe is simply "junk"—and a poor quality of junk at that.

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By the Way

Some Industrial Information Worth the While

Hard Wall Plaster

"Plaster" is the title of a booklet which the Western Building Material Company is issuing.

In it is the specification for the use of "Reno" Plaster, together with much information relative to plastering materials.

Commencing with a small mill in San Francisco, where "Marbleite" was produced, the Western Building Material Company developed so large a demand for that brand that plans were soon perfected in the new mill of the Western Gypsum Company of Reno.

In this plant are embodied the very latest ideas in plaster machinery, which permits of a normal output of 125 tons each working day.

Associated with the enterprise are men who are thoroughly versed in plaster making, as Dr. Gould, with his fifteen years' scientific and practical experience, is known as the head of the plaster profession today.

Reno quality means good sand carrying capacity, fairly slow set, rich working quality and a strong hard wall.

A laboratory fully equipped insures uniform quality.

The Western Building Material Company do not advocate excessive adding of sand, which is detrimental to a good wall, and at the same time takes more labor to mix and use. The plasterer makes nothing by oversanding but it does hurt the owner who pays for a genuine hard wall covering.

Among the buildings plastered with Marbleite and Reno are: Kohl building, put on by Smythe Bros.; McDonough building, by King Plastering Co.; Clark Apartments, by Scofield-De Palo Co.; Oakland Bank of Savings, by Jas. Pedgrift; First National Bank of Oakland, by Geo. Dixon; Military Barracks, Alcatraz, by G. Waldo Cutler; Government Building, Fort Barry, by Jos. Campbell; Presidio Barracks, by Jos. Campbell; Chronicle building, by Smith & Watson; Schroth building, by Knowles & Kaiser; Congregational Church, by J. J. Connolly; German Hospital, by Smythe Bros.; Fabiola Hospital of Oakland, by Geo. Dixon; Granada Hotel, Gibson, McIntyre, Satterlee.

From this array of buildings in San Francisco and Oakland can be gathered some idea of "Reno" quality.

Previously, through local production being small, plaster was shipped from remote Eastern States, although the quality was not any better, if actually as good as our own local material.

It is therefore with no little pleasure that we welcome the advent of a plaster mill which offers so much as the Western Gypsum Company do with their "Reno" brands of gypsum products.

Covered With "Watsonite"

The following buildings have been recently covered with the "Watsonite" roof, laid by the Watson Roof Company: Hibernia Bank, Mercantile Trust, Adam Grant, and The John A. Roebling's Sons Company. The "Watsonite" Roof has all the virtues of the felt and gravel roof and many decided advantages. It is perfectly smooth, without joints, simpler in construction, lighter in weight, does away with all metal flashings and has all the sturdiness and splendid water-resisting qualities of the "Watsonite" floor. It is practically the same material as the latter, spread over the roof surface hot and leveled off with straight edges. This roof is also specified for the German Loan and Savings Association and the Metropolitan Life Insurance building.

The same company recently covered the Emporium building on Market street and Baker & Hamilton's new warehouse on Brannan street, San Francisco, with their regular felt and gravel roof, and have the contract for roofing the new White House building.

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Building 909 Feet High

An office building 909 feet in height has been planned to replace the old home of the Equitable Life Assurance Society, occupying the blocks bounded by Pine, Nassau and Cedar streets and Broadway, New York. It will therefore be 251 feet 7 inches higher than the annex to the Metropolitan Life Building, being erected at the north end of the block fronting Madison avenue, from Twenty-third to Twenty-fourth street. With its annex, which is nearly finished, the Metropolitan Life building is the tallest office structure in the world, as it rises 657 feet 5 inches above the curb line. It has forty-six stories. The Singer building is the next tallest office building in the world. It was recently completed, and for some weeks held the unique place of being the world's highest office structure. Its forty-one stories reach a height of 612 feet 1 inch above the curb.

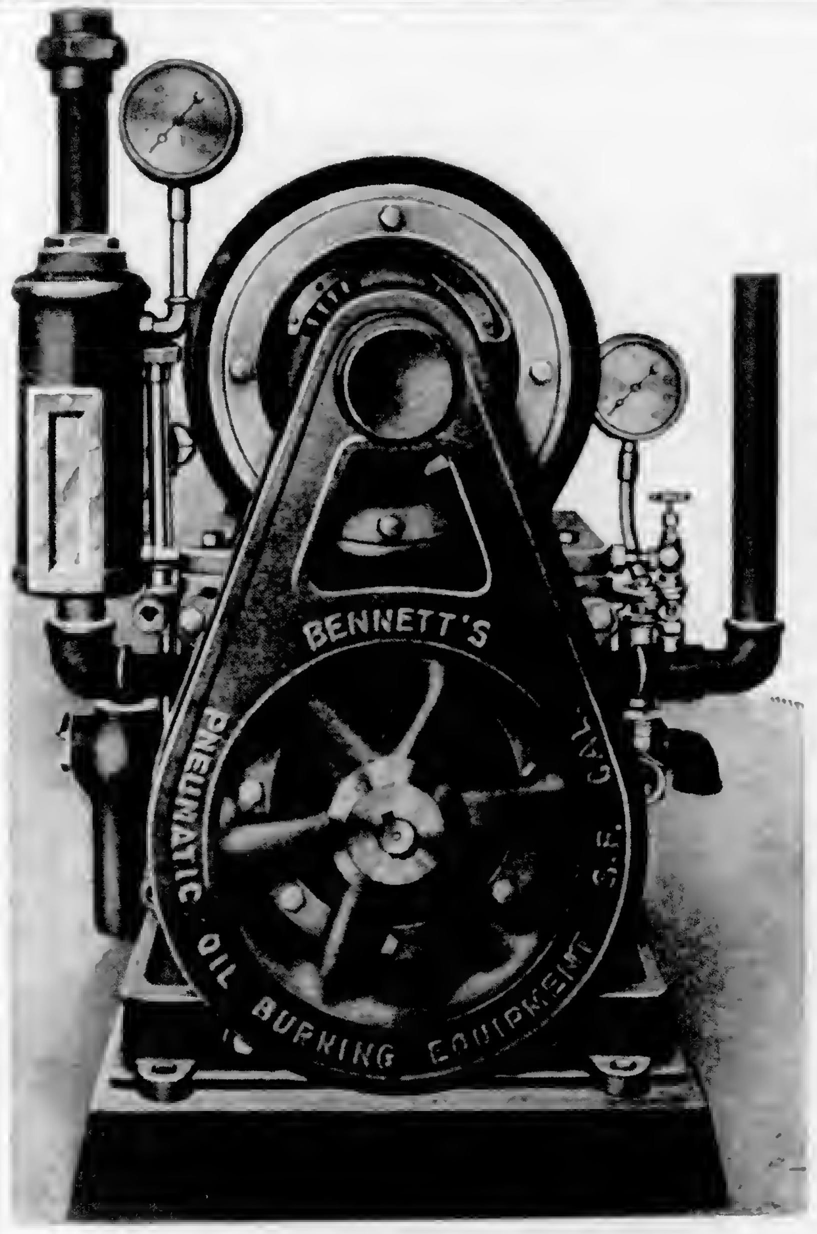
The Eiffel Tower in Paris is 984 feet high. The Washington Monument is only 555 feet.

In every respect will the proposed new home of the Equitable Life be a record office structure. Besides being the tallest, it will occupy the most expensive skyscraper site in the world, as the estimated value of the land on which the present building stands has been placed at from $12,000,000 to $15,000,000. It will have, too, sixteen stories more than the Metropolitan Life, twenty-one more than the Singer, and will be over three times the height of the Trinity building, opposite, with its twenty-one stories and rising 280 feet 6 inches above the curb. It will also be the costliest office building in the world, as D. H. Burnham & Co., architects, who have drawn the plans for this greatest of all skyscrapers, place the cost at $10,000,000.—N. Y. Tribune.

Put in Hardwood Floors

Next to marble or tile flooring, rank the floors made of hardwood. Of late an increasing interest is being taken in the question of good flooring. The man who builds to sell is not as much interested as the man who builds for himself. A practical builder states that the only question open to difference of opinion regarding hardwood floors is as to the kind of material used, the style of workmanship, and the finish.

The man that does the selling—if he does it well—has to earn his hire these days.



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The Keystone Company is at present busy on an order for eight 650 horsepower boilers for the Southern Pacific Company.

Modern Floor Finishing

The Bridgeport Wood Finishing Company has published an attractive booklet entitled "Modern Floor Finishing," which gives some valuable information in regard to the care of hardwood floors and the various treatments necessary to obtain the best results. The book will be sent free upon application to the Pacific Coast agents, Messrs. Whittier & Coburn, San Francisco and Los Angeles.

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Concrete Residence

Architect Charles E. Shattuck, 318 Mason building, Los Angeles, has in preparation plans for a large cement-reinforced concrete Mission style residence to be erected for Messrs. Post & Klusman, on their 600-acre vineyard at Cucamonga. It will have a living room, 20x30 feet in size, with large stone fireplace, dining room, breakfast room, den, kitchen, four bed chambers, bath, besides numerous closets. The finish will be in various hardwoods, with polished floors throughout. One of the features of this house will be a double compartment cooling-room and refrigerator combined. In the center will be a spacious patio, to which all rooms have access. It will be covered with glass, and will contain fountain, flower beds, etc. The residence will be surrounded on two sides by 12-foot porches. The roof will be tiled.

Building for Pasadena

The plans of Architect F. L. Roehrig, Byrne building, Los Angeles, for the proposed administration building to be erected on the grounds of the Pasadena hospital at Pasadena, have been accepted. The building will be erected as a memorial to the late E. M. Fowler, the funds for its erection being provided by Mrs. M. and Miss Kate Fowler. It is estimated to cost about $60,000.

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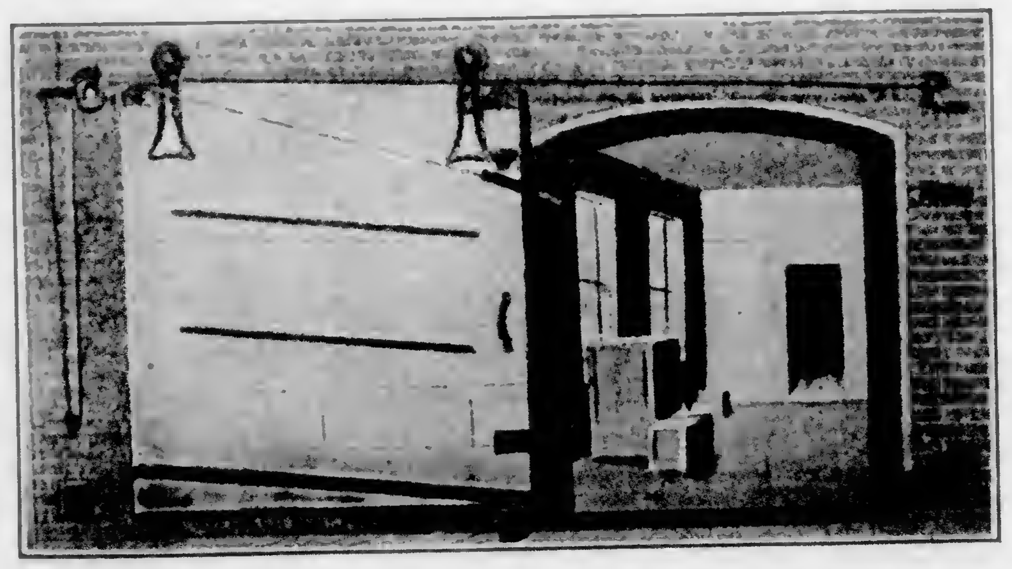

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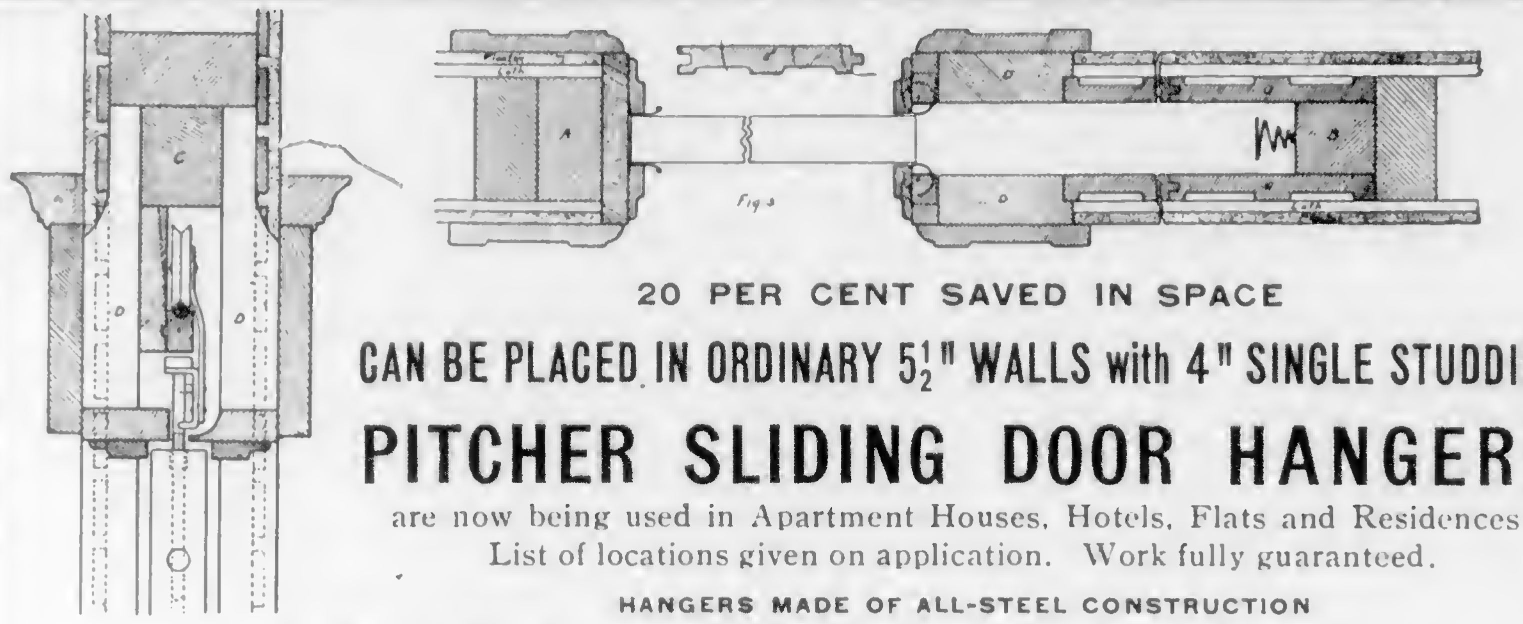

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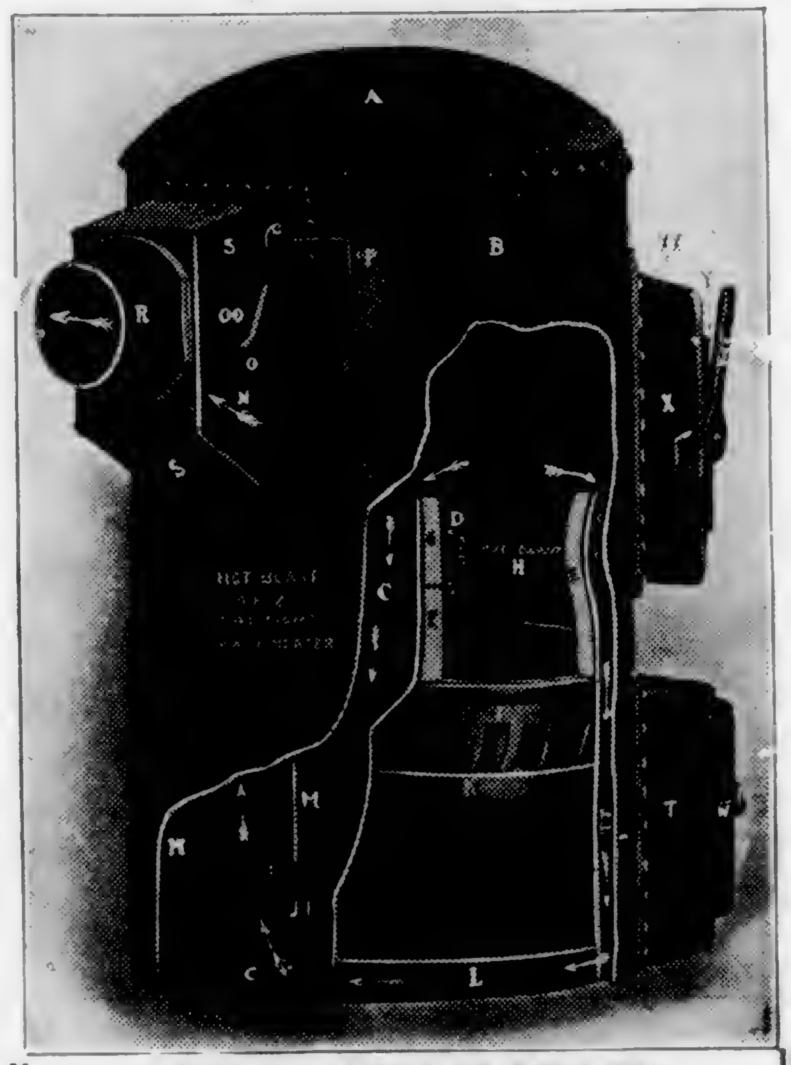

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A Notable Case of the Open Shop's Success

If anybody tells me that the unions could not thrive under the open shop plan, I will show him that he is in error. As one illustration of this error, I will cite the case of the Amalgamated Engineers' Society of Great Britain, which has more members on its roll and more money in its treasury than any other labor society in the world.

That organization started out by being as fiercely devoted to the closed shop as any labor society in the United States is, or ever was. It upheld that tyrannical and reactionary idea as rigidly as do any of the unions which are affiliated with the American Federation of Labor. This practice had the usual results. The society's members became careless and inefficient in their work, unfaithful to their contracts and belligerent in their attitude toward non-union men and toward their employers. Strikes, lockouts and general turbulence came as a consequence. Then when it had dropped to the verge of collapse as an organization, the society gave up its barbarous practices and declared for the open shop.

The advance in its fortunes came quickly. Its members became tractable, industrious and progressive. They began to take an interest in their work. Realizing that the quality of their work and not the union card which they carried in their pockets determined the value which they would have to their employers and the wages they would receive they found a new incentive to excel, and they did excel. From the man who worked beside them they asked no questions as to his membership or non-membership in a union. In opportunity to work, and to gain the rewards which faithful, efficient work brings, all were on terms of absolute equality.—James W. Van Cleave, in "American Industries."

Demand for Fireproof Doors

The California Fireproof Door Company is having a good demand for its fireproof doors and also for the Wilcox Fire Door hangers, an illustration of which appears in the company's advertisement elsewhere in this magazine. The company has recently installed metal doors in the Bank of Italy building, Mergenthaler Linotype Company building and the Sunset Telephone building in San Francisco, and the sub-station of the Sunset Telephone Company in Oakland.

Statuary Work for Pioneer Building

The San Francisco Metal Stamping and Corrugating Company of 296 Eleventh street, near Folsom, is turning out all the statuary work for the handsome new Pioneer building on Fourth street. The same firm has executed in sheet metal a fine life-size model of a bear for the Native Daughters.

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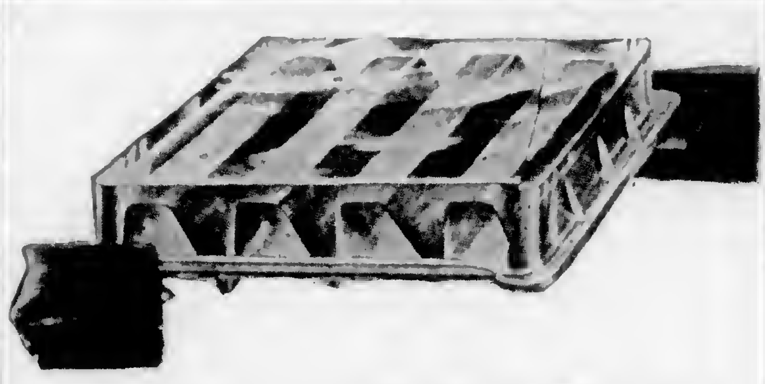

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A New Enterprise

The Wagner Ornamental Iron Works, Inc., has leased the building numbered 473-485 Sixth street, San Francisco, and will carry on an establishment where the San Francisco building public can feel assured of getting the best grade of work, and turned out promptly.

The Wagner Company is under the management of Mr. George Wagner, president; Mr. H. Hollensleben, vice-president, and Mr. A. Jorgensen, secretary, Mr. Wagner being general manager.

Mr. Wagner is a new-comer to San Francisco, having for years been the senior member of the firm of Wagner & Schnitzer, ornamental iron workers of Baltimore, Md., and his long experience qualifies him for the management of the company, and ensures the conservative handling of the enterprise which augurs well for its stability.

Mr. Hollensleben is also from Baltimore and was for a long time estimator with Deitrick Brothers of Baltimore, a large structural steel and ornamental iron firm.

Mr. Jorgensen is well and favorably known to the San Francisco builders by reason of his long connection with the California Artistic Metal & Wire Company.

The Wagner Company will manufacture a complete line of ornamental and artistic metal work, including fire-escapes, elevator fronts and enclosures and cars, store fronts, stairs, railings and gates, front and vestibule doors, lamps and hammers, leaf and scroll work generally.

This concern, which was formerly the "Wagner and Schnitzer Ornamental Iron Works," of Baltimore, was intrusted in that city with a large number of contracts which were all executed to the entire satisfaction of the architects, contractors, and everybody concerned. The following are a few of these contracts: Gymnasium building, Naval Academy and Experiment Station, Annapolis, Md.; New Custom House, Frederick Savings Institute, Pratt Street Power House, Baltimore City Jail, etc.

Their plant is large enough (75x160 feet) for the employment of about 70 men, and is equipped with the best machinery and working tools, and they will be very pleased to have anyone interested (engineers and prospective builders) inspect their plant. They will always make it a point to do only first-class work and feel confident that this method will make this concern very successful.

Native Sons to Build

The Native Sons of the Golden West are contemplating plans for the erection of a six-story brick building on the old site on Mason street, San Francisco.

A building committee comprised of James D. Phelan, Lewis Byington and Adolph Eberhart is working over plans submitted by an architect. The building is to cost about $125,000 or $150,000.

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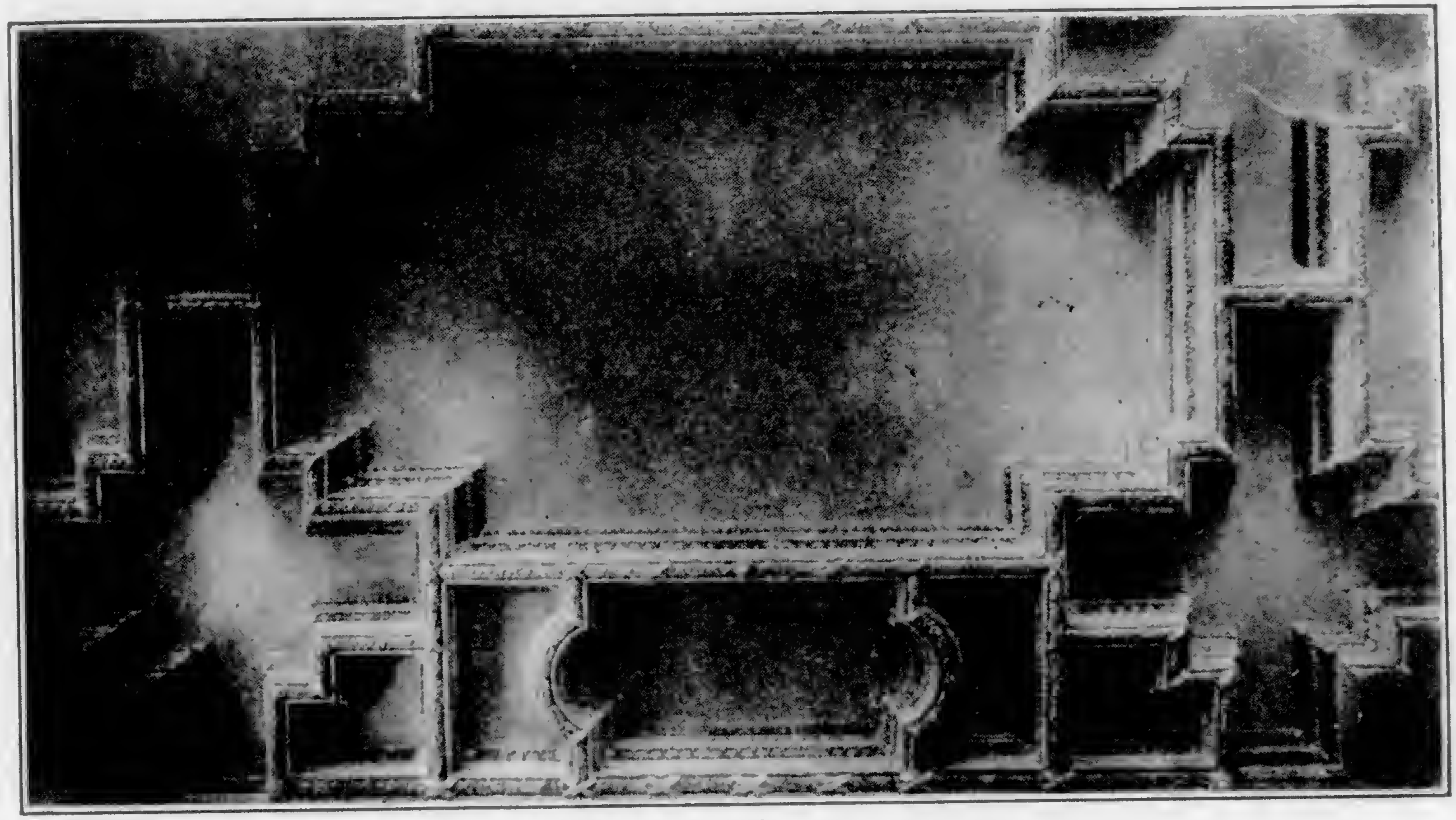

Ornamental Plaster Ceiling in Bank of Italy
Shea & Lofquist, Architects

Artistic Work in Staff and Stucco

One of the most artistic pieces of ornamental plaster work executed in San Francisco of recent date is the interior of the banking rooms of the Bank of Italy building on Montgomery street. The detail, though quite simple, is very effective, and the cut shown herewith gives one an idea of the beauty of the design. The work was done by Callahan & Manetta, contracting plasterers, 344 Tenth street, San Francisco. In addition to the Bank of Italy this firm has executed contracts for ornamental plaster work in a score or more office buildings, apartment houses and residences, including the Italian-American bank, the Murphy, Grant building, the Jewelers, Strauss, Fife and Koshland buildings, the Casino at Santa Cruz, building for the Crocker estate, the Mercantile Bank building, and the new bank at Woodland.

The Why of Jonah

"I wonder why Jonah's name is used as a symbol of hard luck?" said one fisherman.

"That's easily explained," answered the other. "He let the biggest fish on record get away."

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Perfect Ventilation Attained

Problems of how to attain the maximum of ventilation in every building are not new to the architect and builder. Particularly in California it is desirable to let the "climate" in as much as possible. These problems appear to have been solved conclusively by the reversible window that rises or lowers like the ordinary sash or will allow itself to be turned inside out (or outside in, as you please), with equal ease. The explanation is easy—a "shoe" soaked in paraffine to eliminate friction, fits inside the window casing; this is connected with the sash by a weather strip, the sash itself being hung laterally on pivots; when the window is closed, all fittings are sufficiently tight to keep out any inclemency of weather; yet so nicely adjusted are all parts that it is a simple matter to practically eliminate the sash if one wishes to throw the room wide open to the outer atmosphere.

But ventilation is only one feature; it is claimed for this window that it saves its cost in a year—cutting in half the expense of cleaning. The fact that the outside may be cleaned from a standing position on the floor of the room quite as easily as the inside of the window is a great boon to the window cleaner and precludes the possibility of damage suits to the owner of tall buildings. This window is used in every variety of building — residences, hotels, business blocks, office buildings, etc. The Hipolito Screen and Sash Company, 634-638 Maple avenue, Los Angeles, is now using different sizes of malleable iron or bronze pivots to carry the weight of any size window. Among the new buildings equipped by the company are the Hicks-Hager apartments, the Kerckhoff block, the Y. M. C. A. building, Hamburger's mammoth department store, Security building, Fifth and Spring streets, and International Bank building.

Triangular Rib Metal

The problem of reinforcing lintels and sills so as to permit their being handled with safety before being placed has confronted many concrete workers. To overcome this difficulty the Trussed Concrete Steel Company, 650 Trussed Concrete building, Detroit, Mich., has placed on the market its "Triangular Rib Metal." The steel is easily placed and it is said to be impossible to misplace the reinforcement in the mold sufficiently to endanger the strength of the lintel. In placing this reinforcing, two ribs are put at the bottom, where the most reinforcement is needed, the light connecting spacers being sufficient to take up the shear. Triangular Rib Metal is furnished in either 4, 6 or 8-inch mesh. The company has published some interesting literature on this subject, which every cement user should send for.

ERECTED
190

A Clever Piece of Staff Work by Mr. Jurgewitz after Design by Stone & Smith, Architects
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STAFF AND STUCCO WORK
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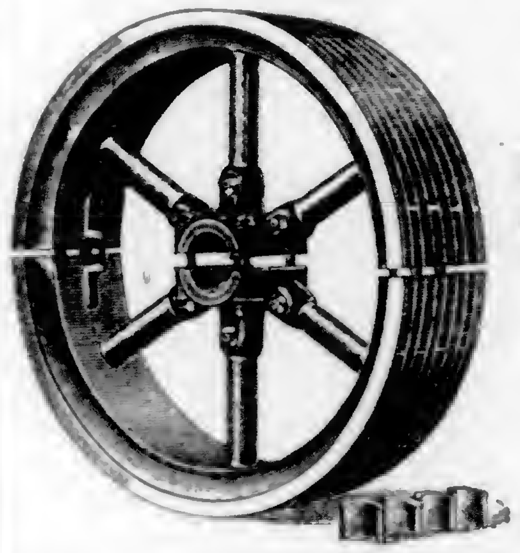

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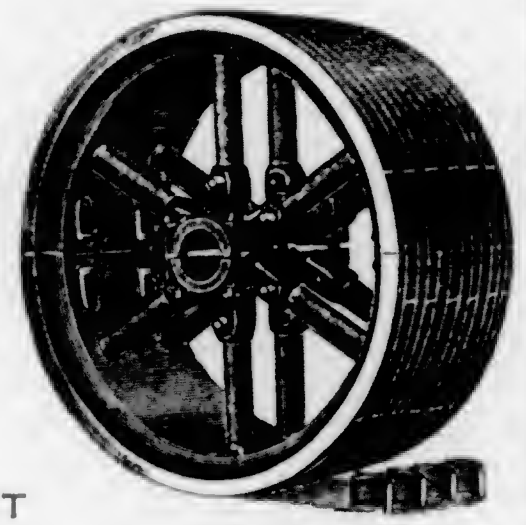

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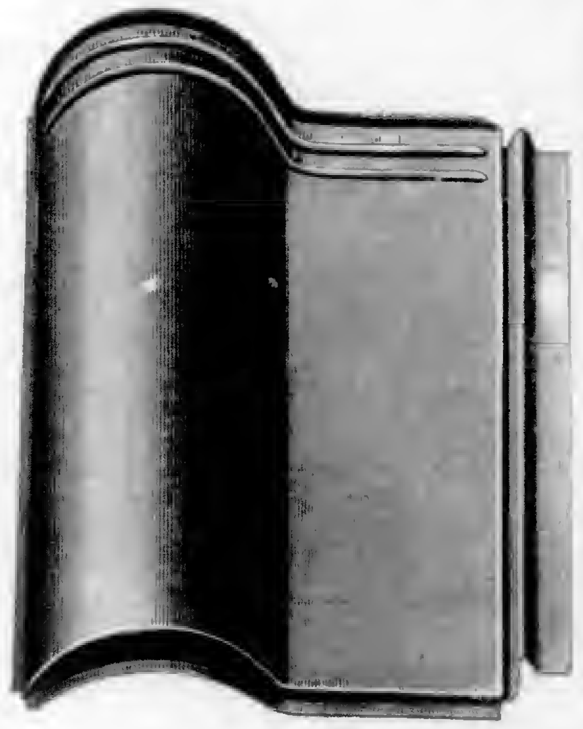

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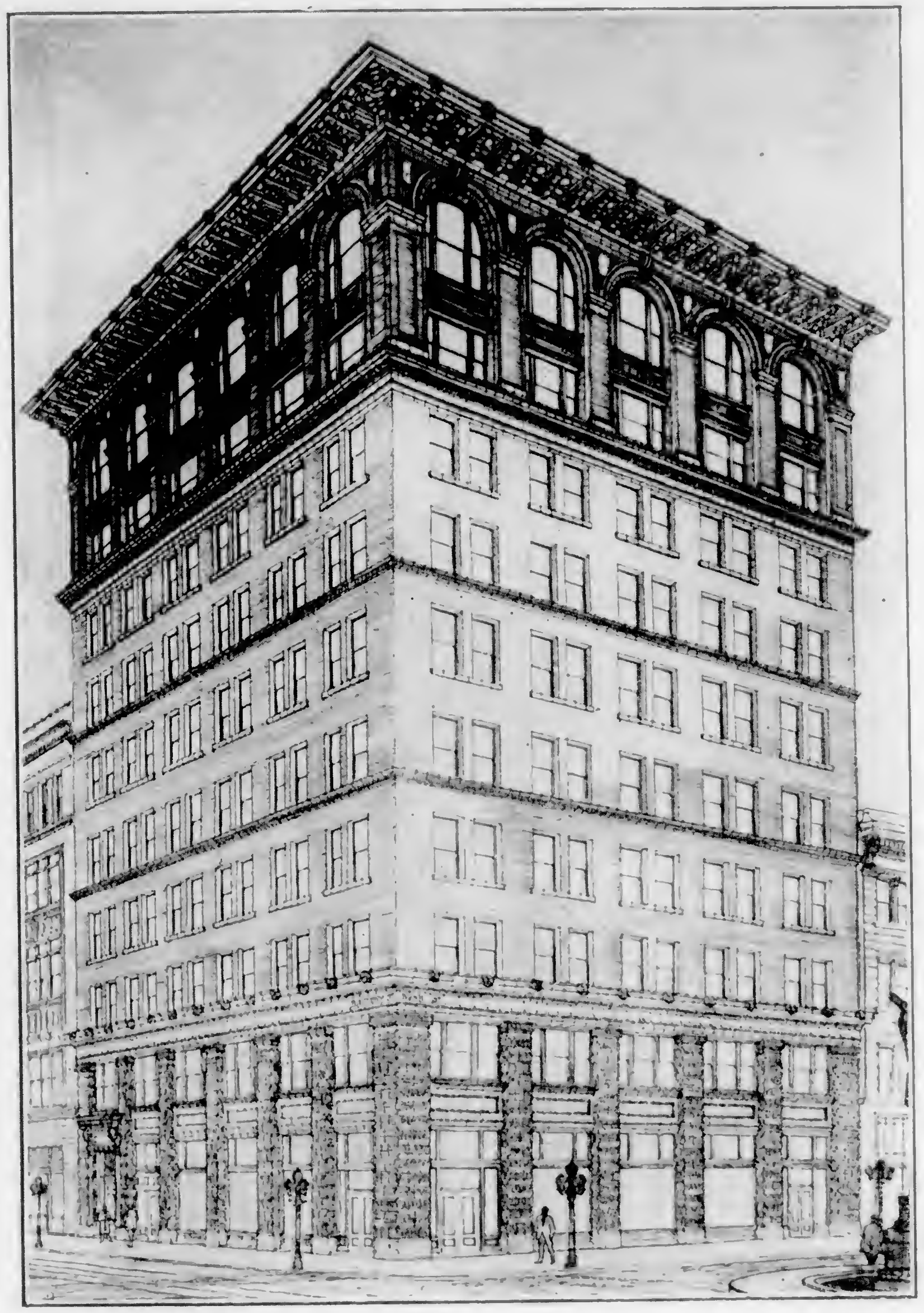

Postal Telegraph Building, San Francisco. Lewis P. Hobart, Architect

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Used Throughout This Building; Furnished Through JOOST BROS. Manufactured by

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SAMPLE OFFICES, 933 and 937 Monadnock Building, SAN FRANCISCO, CAL.

The Carquinez Brick Company

The Carquinez Brick and Tile Company, with offices in the Russ building, San Francisco, is installing ten new downdraft kilns which will materially increase the capacity of the works. This company has been getting its share of the common brick business in San Francisco since the fire, in fact, it has been obliged to turn down orders owing to inability to supply the demand. The improvements now under way are calculated to place the company in better condition to handle an increased volume of business. All the common brick in the new Palace hotel is being furnished by the Carquinez Company, besides the brick for a number of fine apartment houses and the building of the Keystone Realty Company at Hyde and Washington streets. The Carquinez Company has excellent shipping facilities, its plant in Contra Costa county being on the water front as well as close to the main line of the Southern Pacific Company.

Builds Residences

William McKenzie, contractor, with offices at 734 Washington street, reports having recently completed several residence jobs. Mr. McKenzie has been in the contracting business in San Francisco since 1900 and in that time has built several business buildings and cottages.

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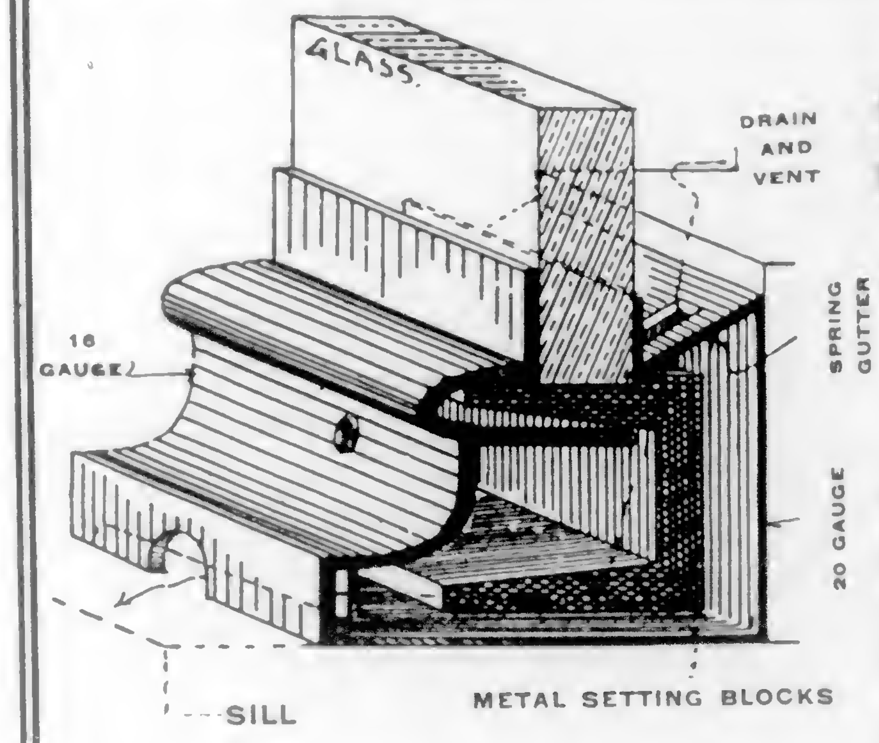

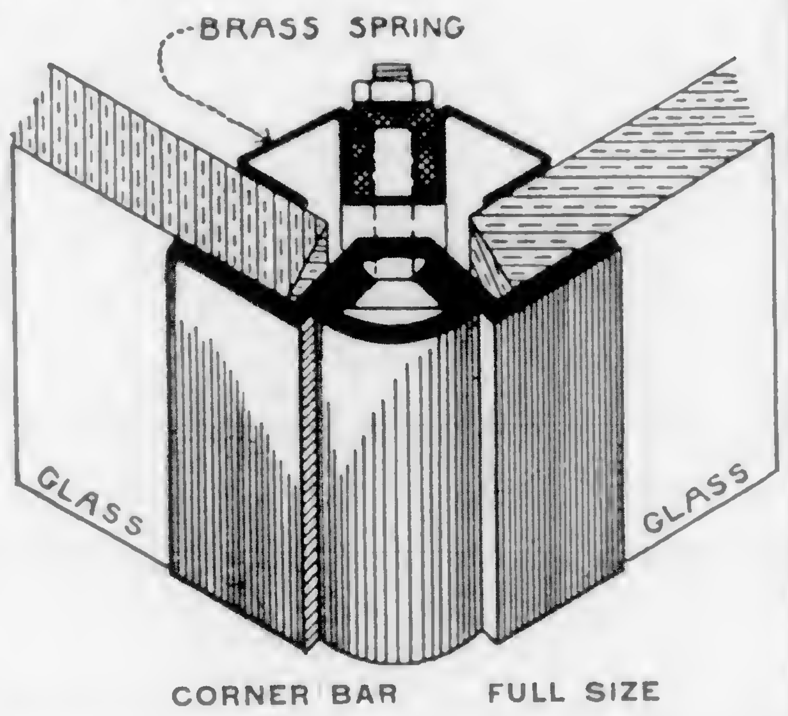

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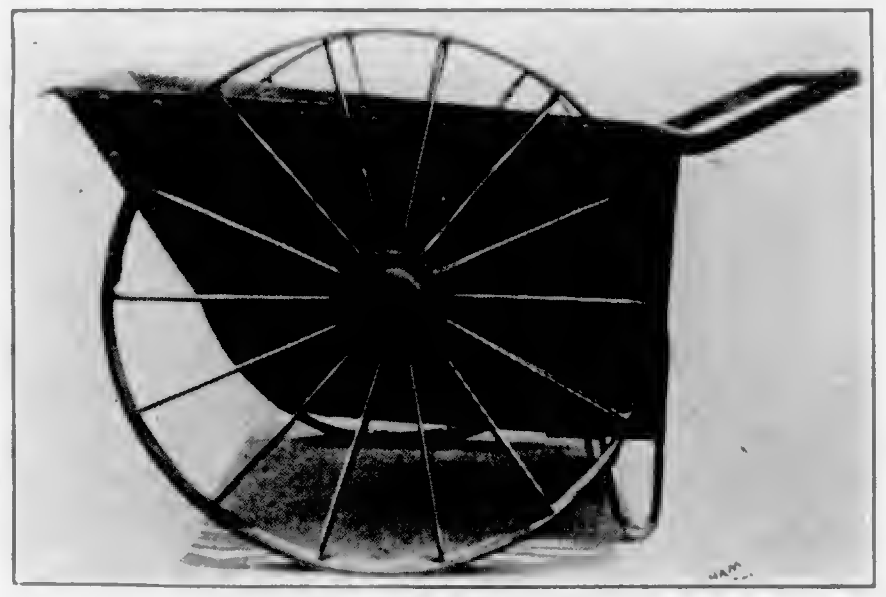

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$100,000 Machine Shop and Foundry

The Smith & Watson Iron Works, of Portland, Oregon, have just awarded contract to Langford & Walker for the construction of a two-story concrete and brick machine shop 110x200, and work has already begun.

Orders have been placed with Eastern firms for modern machinery, including a 20-ton crane, which will be installed with rail facilities running in the shop, thus expediting the loading and unloading of cars.

The Foundry will be of brick and occupy the site of the present shop. This will be 73x165. There also will be a traveling crane with improved spur facilities.

The entire outlay for shop, foundry and new machinery will be $100,000. The Smith & Watson Iron Works make a specialty of iron castings, saw mill machinery and logging engines. Their plant will be the most complete one of its kind in the Northwest.

Hydrex Felt for Church

Hydrex felt and compound has been specified for St. John's church in Chico, T. J. Lyon, architect. The coast representative of Hydrex felt is the L. E. Boyle Company, Monadnock building, San Francisco.

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First National of Oakland

The First National Bank of Oakland has published an attractive little volume descriptive of its new home, together with a short history of the institution which for thirty-four years has been closely identified with the interests of the business community of Oakland. The bank's new building was designed by Architect C. W. Dickey and is of fireproof construction. The book is well edited and quite handsome typographically.

Nodamp Block Machine

The Nodamp Machinery Company, 415 Andrus building, Minneapolis, Minn., has just issued a handsome new catalogue, which every interested cement user should send for. The catalogue describes the Nodamp block machine, the Ames cube mixer, gas engines, pneumatic plants, ornamental molds, etc. In an introductory paragraph the company says: "Since the advent of the first concrete building block machine, with its crude construction, embodying only an attempt at the desired idea, there has been an evolution in improvement to the highest degree of perfection in the Nodamp two-piece metal bond machine that challenges all other makes and elicits the praise and claims the admiration of all cement workers everywhere. The simplicity of construction, ease of action, its durability, with multiplicity of molds, has placed it at the head of all machines today, while the building block produced in two pieces with metal bond supplies a continuous air space, affording perfect ventilation, frost-proof and impervious to dampness, and furnishing an inner wall ready for white finish and decorations with perfect safety, without furring and lathing."

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A SAMPLE TESTIMONIAL

PORTLAND, OREGON, May 16, 1907.

Mr. D. H. Weyant,
President Oregon Sienna Mineral Paint Company.

Dear Sir:—

I have used several barrels of your prepared paint on boat work, and am pleased to say that it has given first-class satisfaction. It covers well, and so far as my experience with it goes, it is durable. I have tried nearly all the prepared paints in this market and have had to discard them for one reason and another. Your paint has proved a surprise to me, as I had come to the conclusion that the only way to get a satisfactory paint was to buy the lead and oil and mix it here. I am glad to be able to use an Oregon product, and am more than glad to find it superior to all others that I have tried. You may send me at once another barrel of barge red and a barrel of white for immediate use.

Yours very truly,
JOSEPH SUPPLE

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SAN FRANCISCO

Buildings in Northwest

The omnibus public building bill, reported recently at Washington, authorizes the following appropriations for Oregon:

Building and site, Albany, $65,000.

Building and site, Pendleton, $70,000.

Continuing construction, Eugene building, $20,000.

For Washington:

Buildings, Bellingham and North Yakima, where the Government now owns sites, $120,000 each.

Sites, Olympia and Walla Walla, $20,000 each.

Site, Everett, $15,000.

For Idaho:

Building, Lewiston, $75,000.

Site, Pocatello, $10,000.

New Bids Asked for Work at Fort Mason

Work on the great docks and warehouses at Fort Mason, which was supposed to have begun a month ago, has been delayed by the surrender of the contract.

New bids are being taken, which will delay the beginning of the structures for several months. The money at the present time available to spend at Fort Mason for these improvements is $1,500,000.

William B. Abbitt
Construction
Company
Erectors of Steel Buildings
and
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Office: 374 Monadnock Building
San Francisco ✻ Phone Douglas 2446

PROPOSALS WANTED

Construction Work for Marine Corps.

Headquarters, U. S. Marine Corps,
Quartermaster's Office, Washington,
D. C., August 14, 1908.

SEALED PROPOSALS will be received at this office until eleven A. M., September 15, 1908, and then be publicly opened, for the construction and completion of a marine barracks and officers' quarters at the Naval Training Station, San Francisco, Cal.

Proposal blanks, plans, and specifications, and other information may be obtained from Reid Brothers, Claus Spreckels Building, San Francisco, Cal., the Depot Quartermaster, U. S. Marine Corps, 330 Jackson Street, San Francisco, Cal., or from the undersigned.

The latter reserves the right to reject any or all bids or parts thereof and to waive informalities.

F. L. DENNY,
Colonel, Quartermaster.

Architects, Attention!

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CALIFORNIA AGENTS

Monadnock Building San Francisco, Cal.

Money Supplied for Building Purposes

Hansbrough & Yorston, general contractors and builders with offices in the Metropolis Bank building, San Francisco, are prepared to furnish money for building purposes to owners of lots who have not sufficient ready cash with which to finance the construction of a building. The company will accept the lot as part security.

Recent contracts taken by Hansbrough & Yorston include a three-story brick and concrete building for John H. Sears in Ross Alley at a cost of $32,000; also a two-story building for Mr. Dusenberry at Stockton and Green streets, a two-story and basement store and hall building at Haight and Fillmore streets, planned by Architects Curtin & Foley and a reinforced concrete stable on Van Ness avenue.

Canton Metal Ceiling

The Fogle & Mauer Co. are now the San Francisco representatives of the ceiling department of the Canton Art Metal Company. A. E. Chaffey is no longer connected with the company, having removed to Rawhide, Nevada. The Fogle & Mauer Company intend to push the sale of the Canton goods, and a number of good contracts have lately been filled by them, including metal ceilings in the Citizens Bank of Fruitvale, Lundstrom's hat stores in San Francisco and the Byron-Rutley tailoring house in Oakland.

Removal Notice

The Golden Gate Brick Company has moved their office to 660 Market street, opposite the Palace hotel, San Francisco. Their office is on the second floor with a Market street frontage. The telephone number is the same, Kearny 3378.

Branch of Roses and Grapes Executed by Chr. Deterding.

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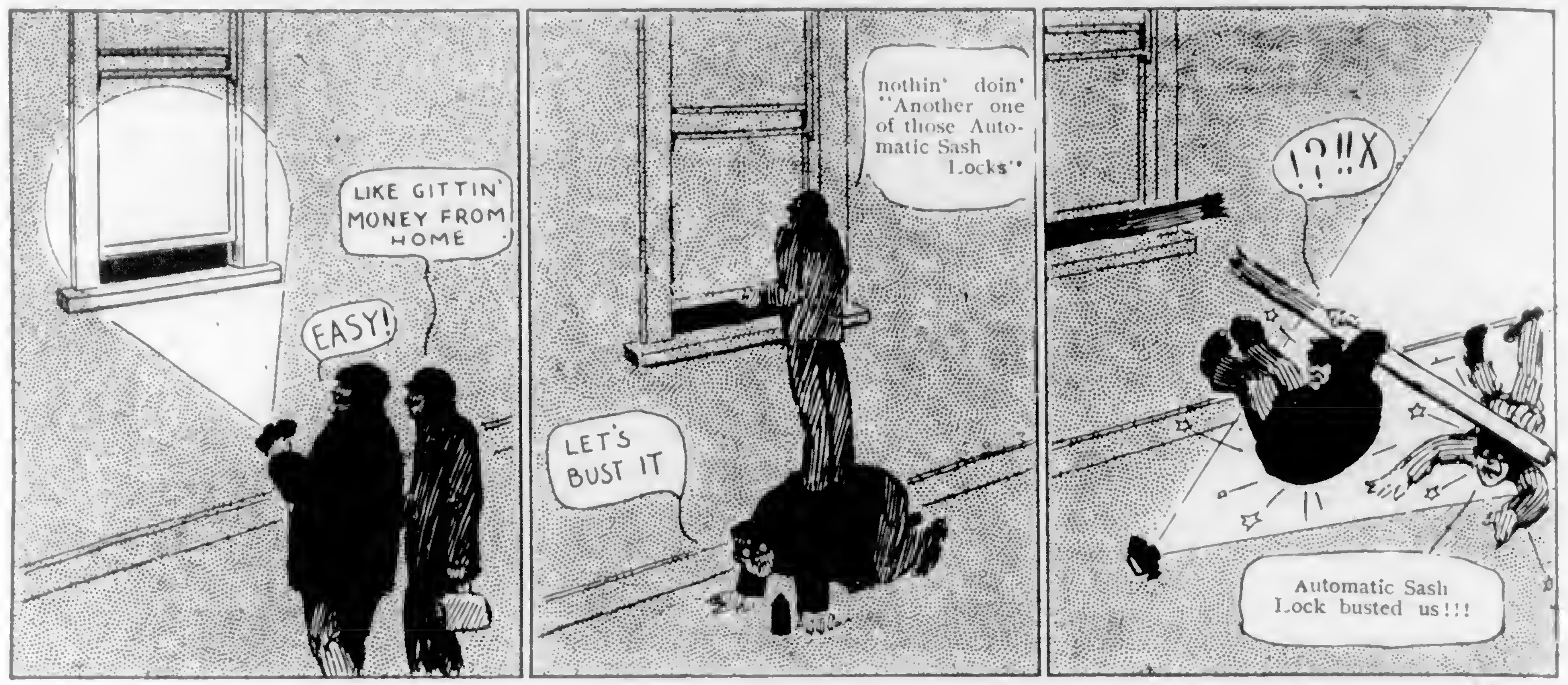
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EASY!
nothin' doin' "Another one of those Automatic Sash Locks"
LET'S BUST IT
!?!!X
Automatic Sash Lock busted us!!!

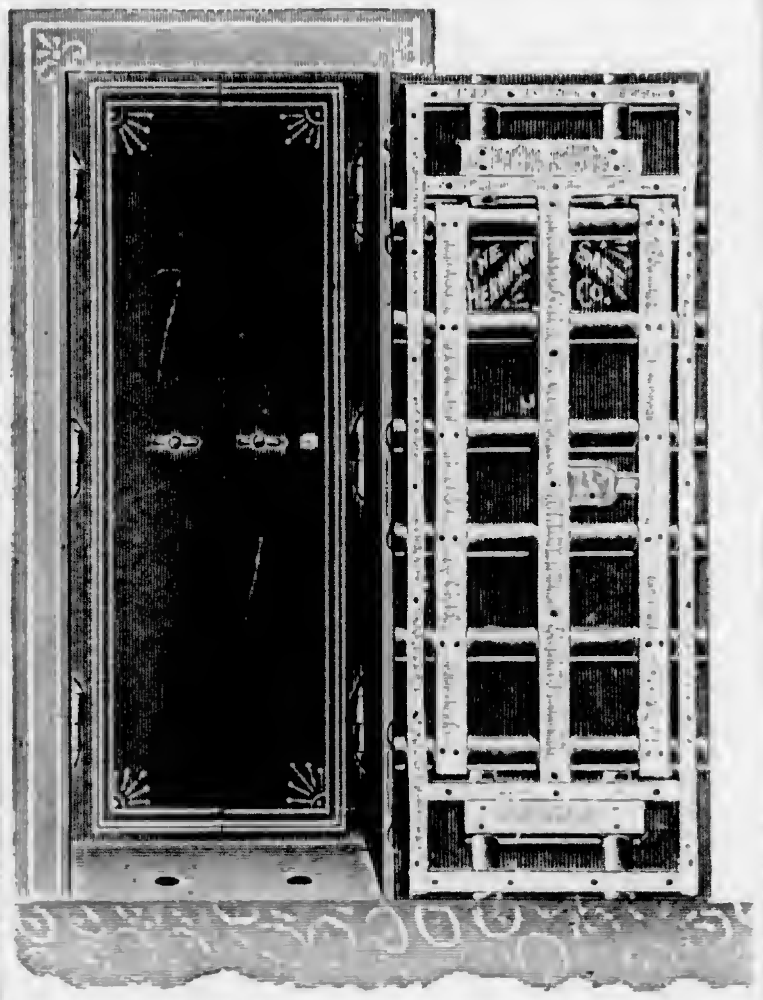
It Fools the Burglar

Worth Having

The Automatic Sash Lock Company, recently incorporated in Los Angeles, reports business good. The company has placed on the market an improved device that promises to revolutionize the automatic lock business. It is claimed the lock is without an equal for simplicity, strength and safety. There is nothing complicated about it. A single lever controlled by a single push button operates a single set of bolts. The bolts are engaged in specially contrived "racks"—one for the lower sash and the other for the upper. You close the window in the old-fashioned way, but to raise it you must push the button. The lock is made of pressed steel, defying time and tampering. Only the ornamental brass head of the push button is visible.

From the inside a child's finger can manipulate it. From the outside a burglar's jimmy cannot move it. Cut away the woodwork and the bolts remain snug and invincible in their hiding places. The automatic sash lock is woman's comforter. She no longer need worry for fear the windows have been left unlocked. You couldn't forget to lock them if you tried. Raise or lower the sash any height, let go the button and the window locks itself. Write for pamphlet to the Automatic Sash Lock Company, 972 S. Alameda street, Los Angeles, Cal.

The officers are: Samuel R. Guyther, president and manager; T. Dunlop Campbell, secretary, and J. A. Buttress, vice-president. Mr. Buttress is the inventor of the lock, the cost of which is no more than the ordinary sash lock.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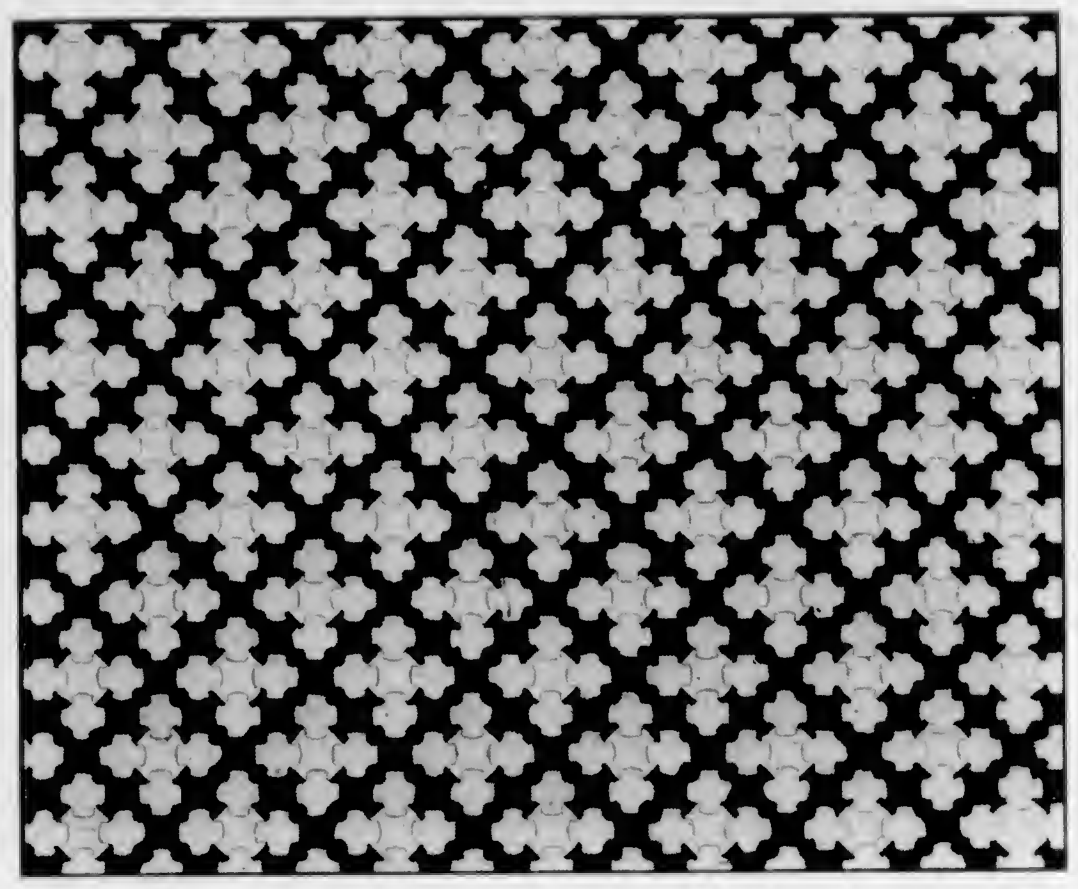
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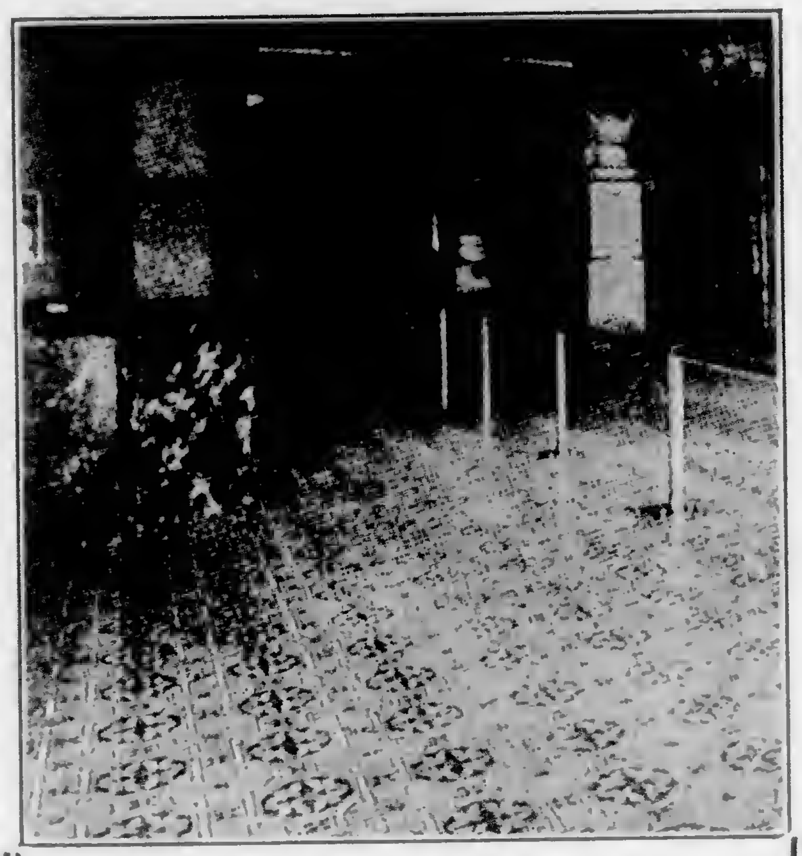
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New Reinforced Concrete Engineer

F. T. Crowe & Company of Seattle, Tacoma, Spokane and Portland, Ore., have been fortunate in securing the services of Mr. F. F. Sinks of Chicago, who succeeds Mr. Heath as the company's reinforced concrete engineer. Mr. Heath has accepted a position as engineer with the Engineering and Contracting Company of Seattle, Wash. Mr. Sinks was formerly of the firm of Condron & Sinks of Chicago and is recognized as one of the best reinforced concrete engineers in the West.

Bungalow Painting Company

The Bungalow Painting Company, Lents, Oregon, succeed the Hazel Painting Company of the same place. Mr. Vose, the proprietor, is one of the few painters who keeps posted on all the new materials and ideas in his profession. He has just returned from an extended trip through the South and Southwest in which he collected much information in connection with up-to-date bungalow work. The bungalow style of architecture is growing in popularity in the Northwest, and a wide diversity of design and decoration is demanded by the architects.

Vaults for Tillmann & Bendel Building

The Hermann Safe Company, manufacturers of fire and burglar proof safes, vaults and deposit boxes, with offices and factory at 120-130 Folsom street, San Francisco has equipped the new Tillmann & Bendel building, MacDonald & Applegarth, architects, with steel vaults of the very latest pattern. The vaults are supplied with the most improved filled doors.

COMPETITIONS

Program of a Competition for a Seal for the Architectural League of America

The Executive Board of the Architectural League of America is desirous of obtaining designs for a Seal to be used in connection with the letter press of the League. There shall be a first prize of twenty-five dollars ($25.00), and a second prize of ten dollars ($10.00). These prizes shall be awarded to the designs placed first and second by the Committee, which are to be selected by the members of the League in convention at Detroit.

Drawings—Drawings are to be made on bristol board in India ink line. The actual size of the drawing to be between 2½ and 3 inches. The bristol board to be 12x9 inches.

These drawings are to be forwarded to the Detroit Architectural Club, 92 Griswold street, Detroit, Mich., not later than September 12.

Drawings are to be accompanied by a sealed envelope containing the name and address of the author. No name or device is to be shown on the drawings.

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☞ Lavatories and driveways Baker & Hamilton's new building, Brannan Street. Scores of others – large and small.

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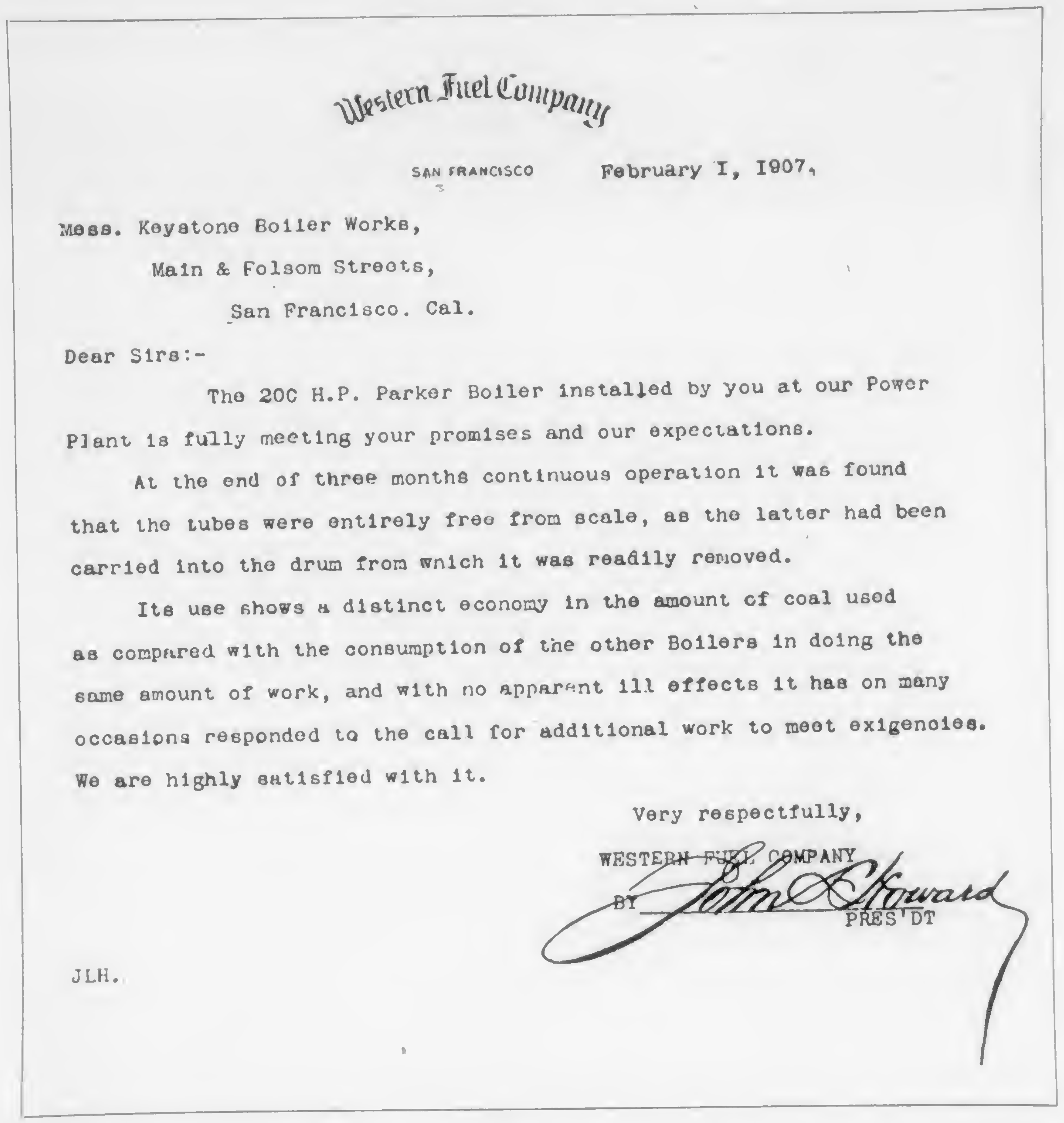

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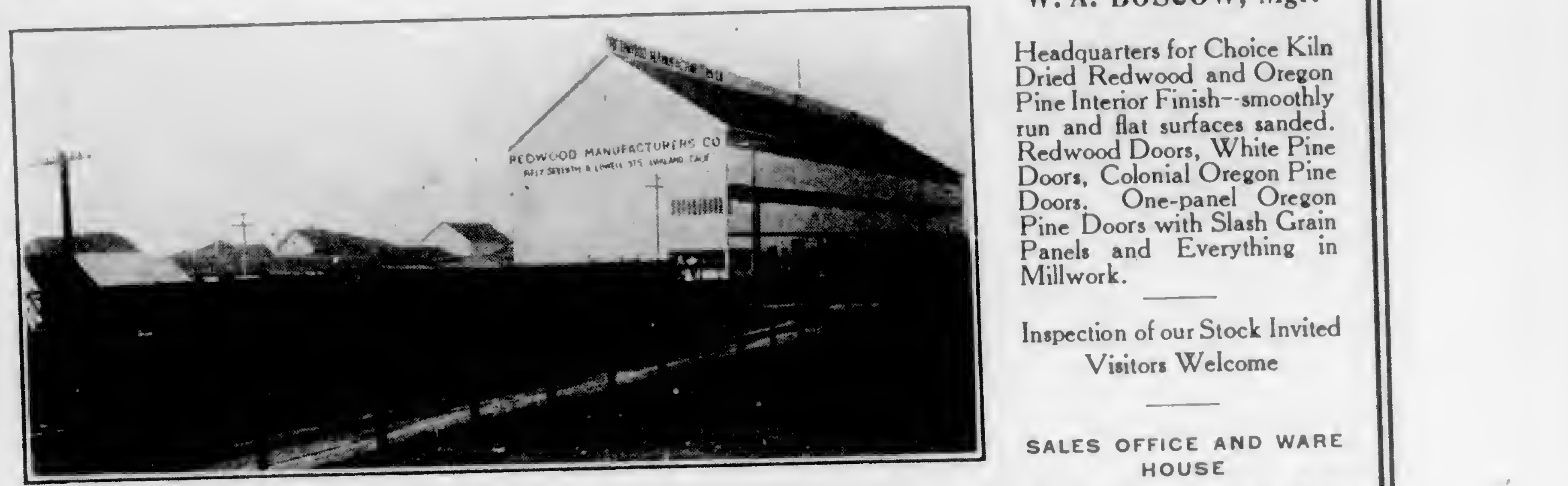

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Electric Contractors' Outing

By One of Them

It was just 10 A. M. on Saturday, August 8, when a happy crowd of men, women and children stepped off the Ferry Slip at the Oakland Mole and gazed expectantly for the contractors' special train which was to take them to the first annual outing of the San Francisco branch of the National Electrical Contractors' Association, held in the picturesque hollow known as Fernbrook Park, near Niles.

There was about one hundred and fifty in the party made up of the many friends of the electrical contractors. Nearly every large electrical jobber and contractor was represented, including the ever-smiling William G. Pennycook, inspector for the Department of Electricity.

"Bill" Goodwin, the baseball bug, and manager of the Sterling Electric Company, was there hunting for a place to play ball. Everybody took some part in the festivities of the day. After lunch the ladies and gentlemen journeyed to the pavilion where there was dancing to nearly every tune from the "Merry Widow waltz" down to "A Good Old Summer Time." Later in the afternoon the sport really began, the committee composed of "Billy" Hanscom (Century Electric Construction Co.), Pete Murman (Decker Electric Co.), and Charlie Wiggins (John R. Cole Co.) got the crowd assembled on a level space above the pavilion where running races were held as follows:

First Event—

First heat (open for all), Mellman first, Dunbar second.

Second heat (open for all), Herbert first, Anderson second.

Third heat (open for all), Ayden first, Fagan second.

Finals of above, Herbert won, Ayden second place.

Second Event—Fat Man's Race.

First heat, Weidenthal first, Levy second.

Second heat, Butte and Cole (tied) first, Fayles second.

The principal feature of this race was when Paul C. Butte, seeing defeat staring him in the face, made one great dive for the finish line. All that was seen for a moment was dust, and then "Smiling Paul" got ready for the final race.

Finals, Fat Man's Race—John R. Cole won, Paul Butte second. Special mention "Pop" Boynton. The next was a ladies' event and then the whistle on the train let us know that it was time to get ready to travel back to San Francisco.

Cash prizes were donated by the following firms: Brooks-Follis Electric Company, Butte Engineering and Electric Company, California Electrical Construction Company, Central Electric Company, Century Electric Company, Decker Electric Company, Electric Appliance Company, John R. Cole Company, Western Electric Company.

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Mr. Geo. Reeves, the owner and manager of the W. H. Wilson & Co. asphaltum and composition roofing business, at 40-42 Natoma street, San Francisco, is not only a coast pioneer, having arrived here in 1864, but his business house is also a pioneer in its line, and they refer with much pleasure to more than forty years of continuous, prosperous and honorable dealing. Their work is guaranteed in every way, and architects and owners who have done business with this firm have been pleased with the way the work has been performed.

Elevators and Dumb Waiters

Those who may be interested in the purchase of elevators and dumb waiters will note the firm of Wells & Spencer Machine Company of 139-141 Beale street, who have done first-class work in San Francisco and Oakland.

This firm has been in business about two years and has installed one electric passenger and two electric freight elevators in the Sloane building on Mission street, four hydraulic sidewalk elevators in the Mills building; also elevators in the Duncan building on Beale street, G. M. Josselyn & Company's building on Main street, McGlynn building on Natoma street and many others.

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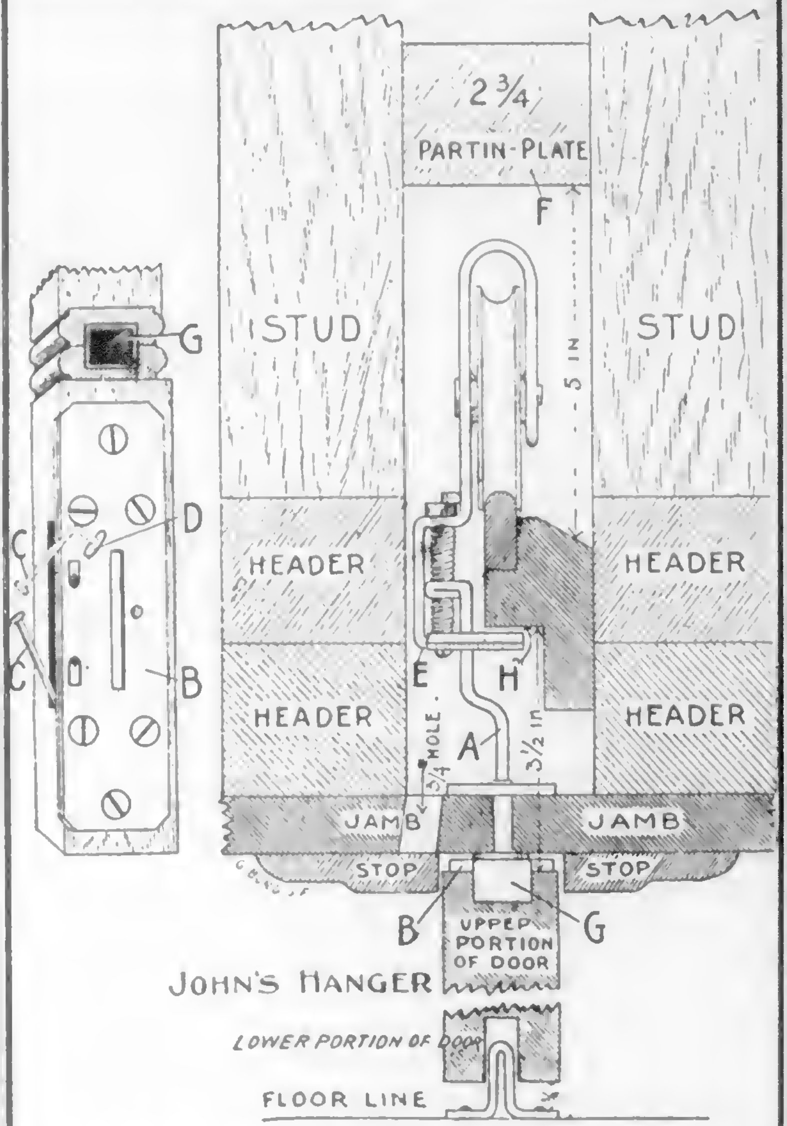

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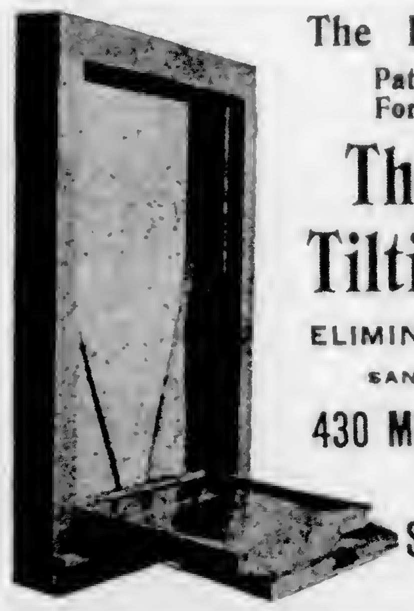

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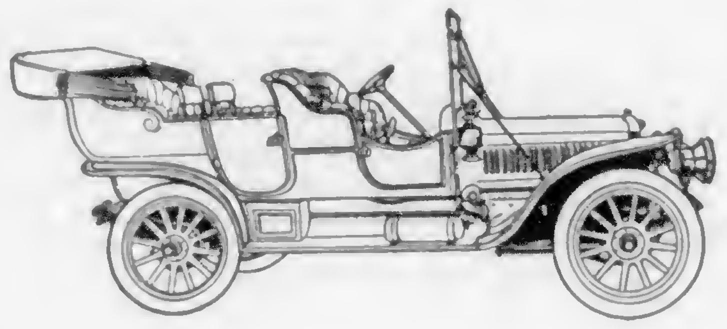

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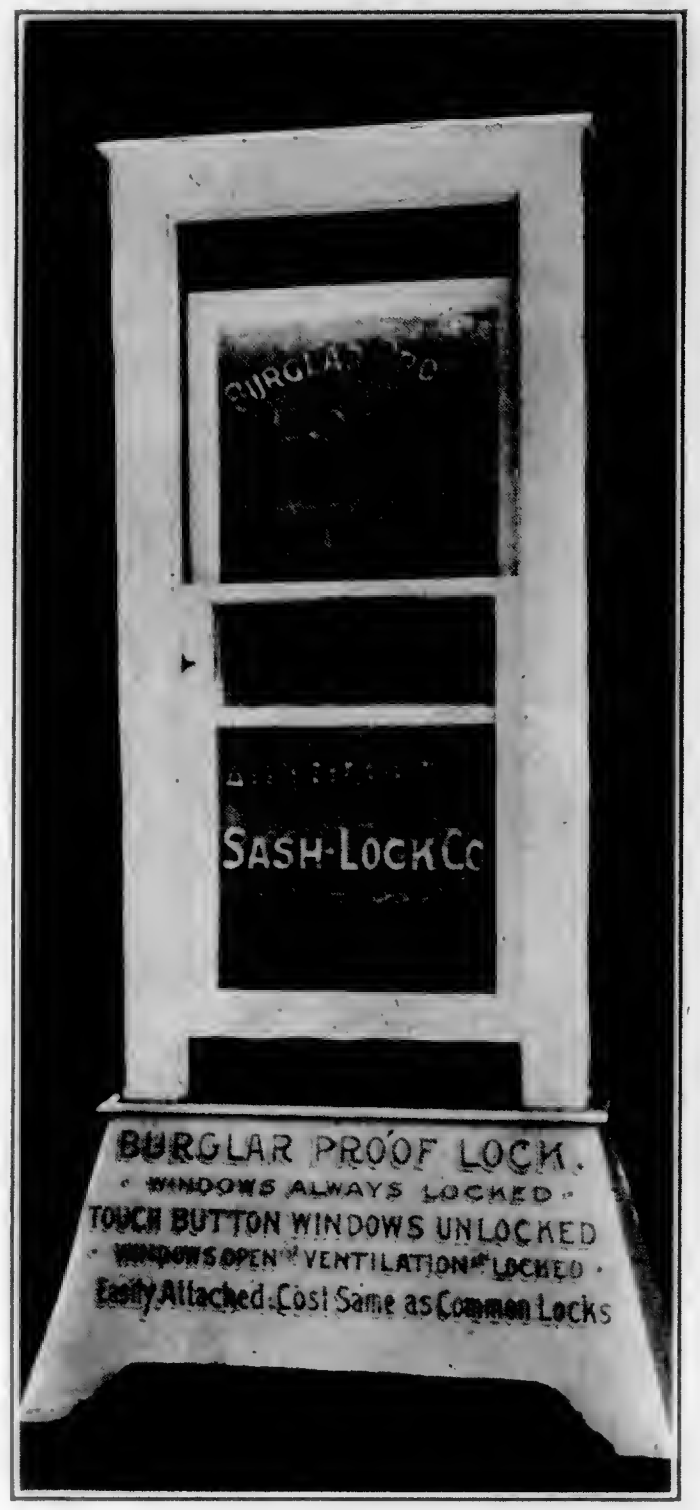
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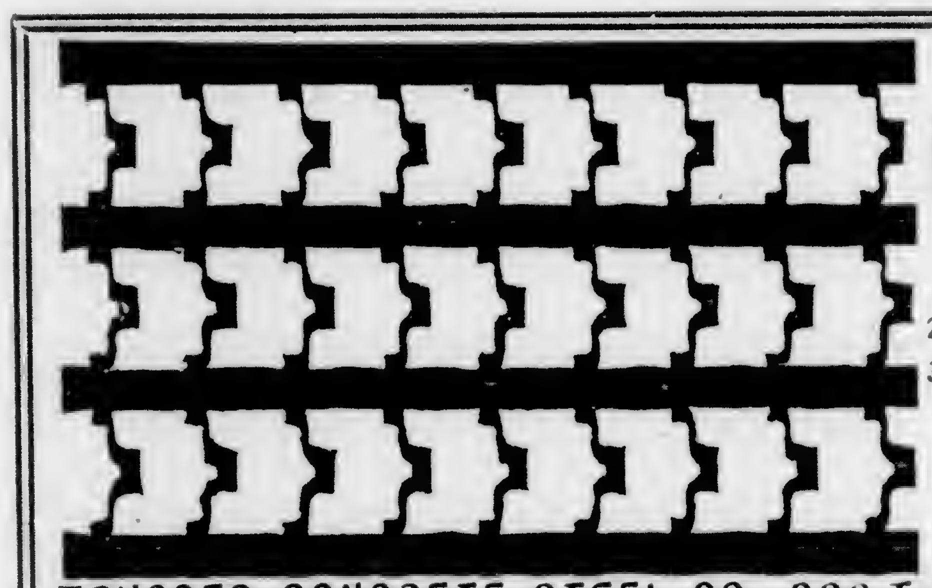

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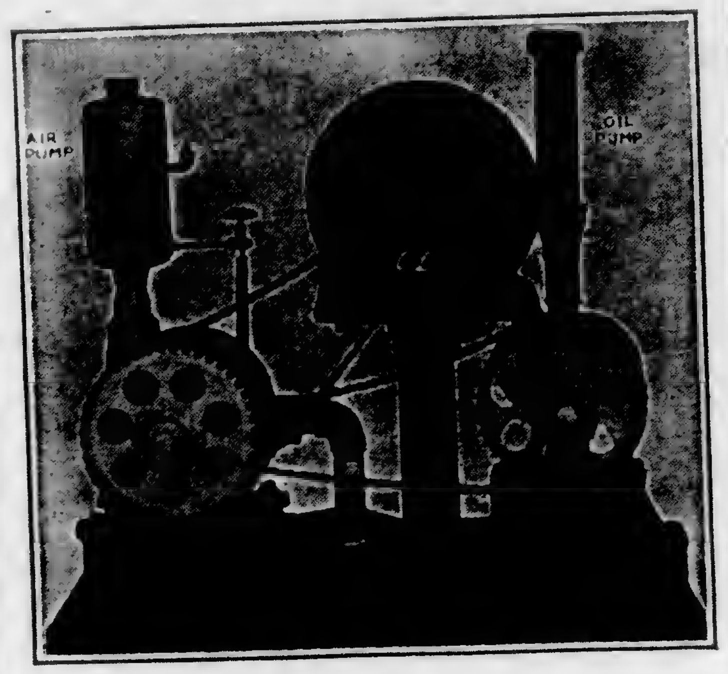

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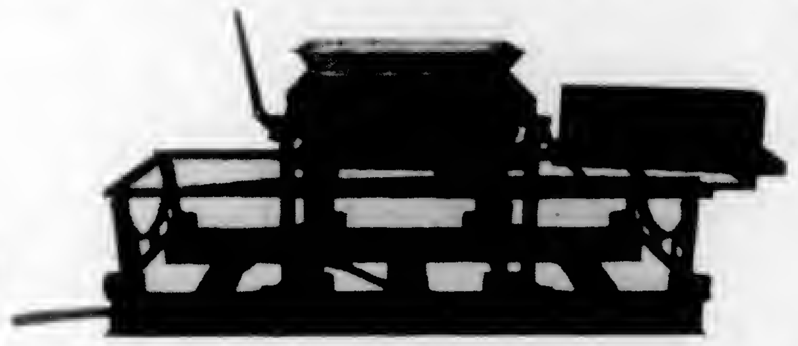

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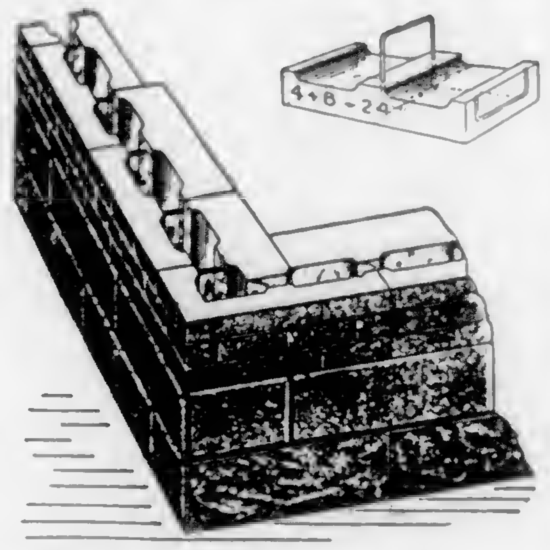

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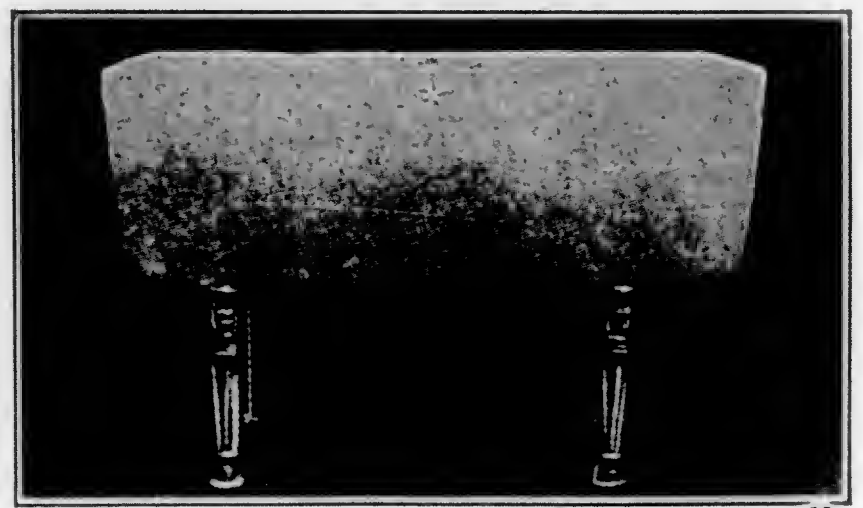

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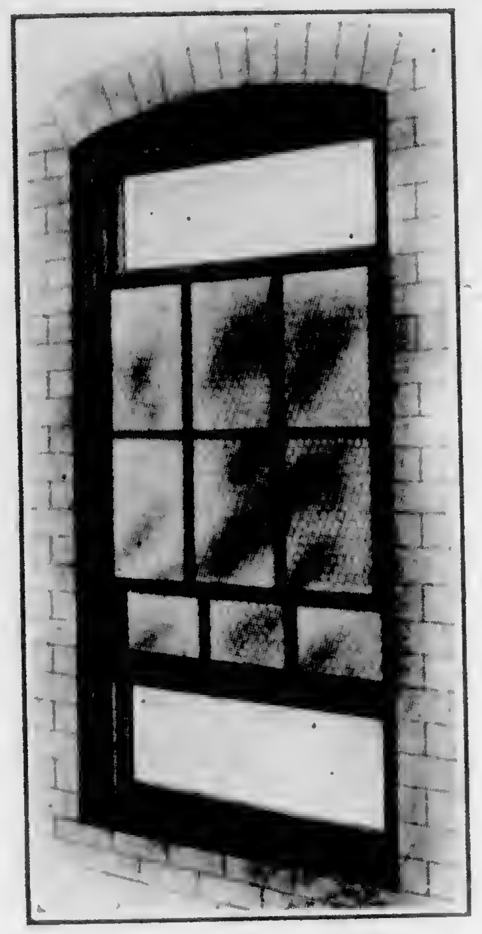

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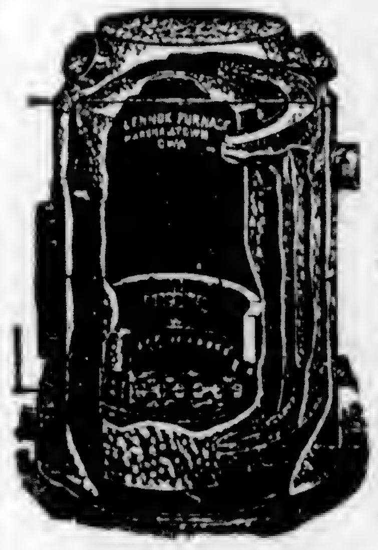

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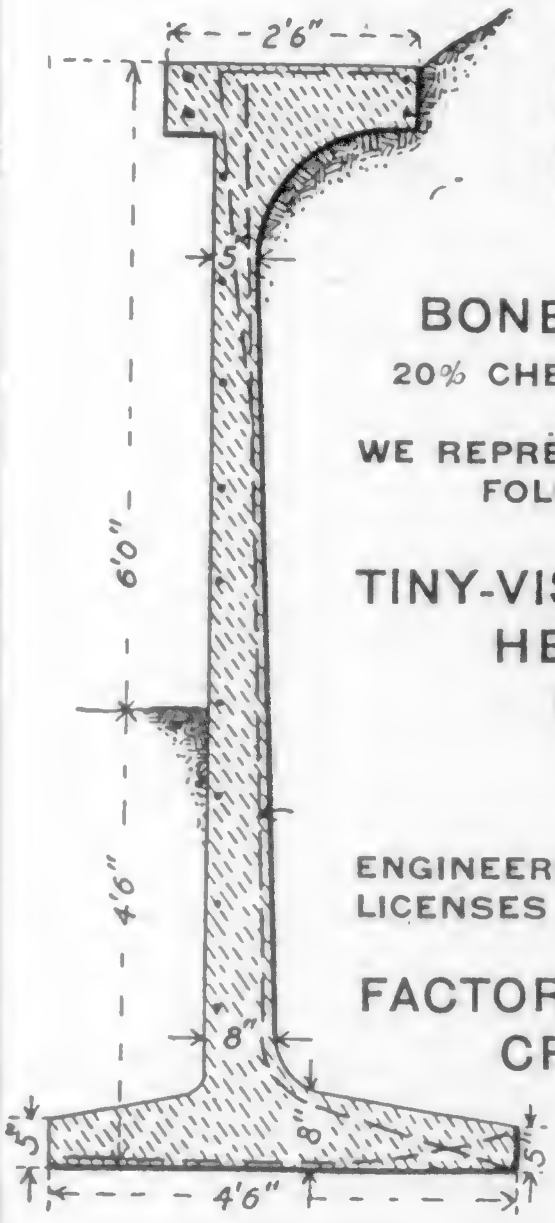

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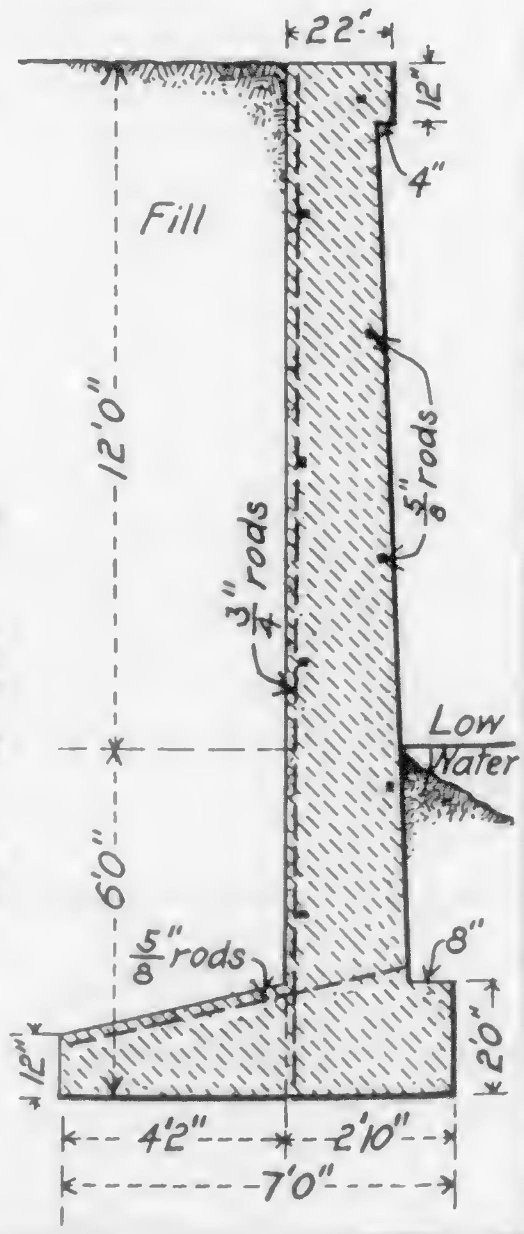

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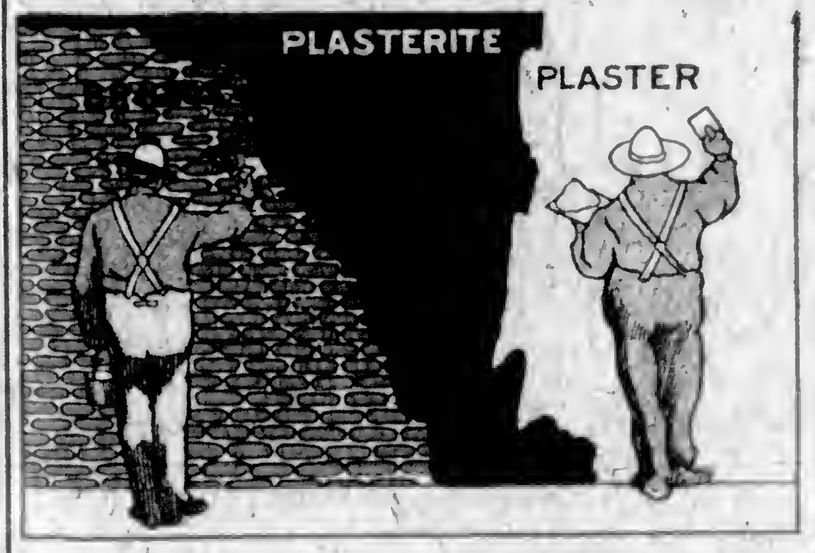

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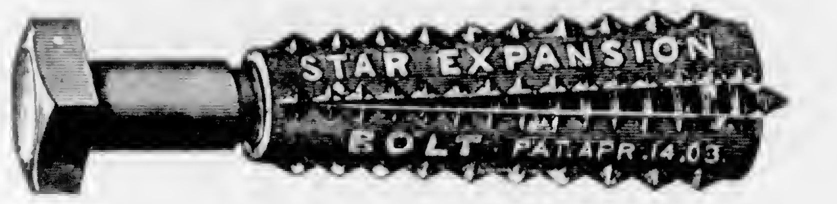

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Architect

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VOL. XIV. SEPTEMBER, 1908. NO. 2.

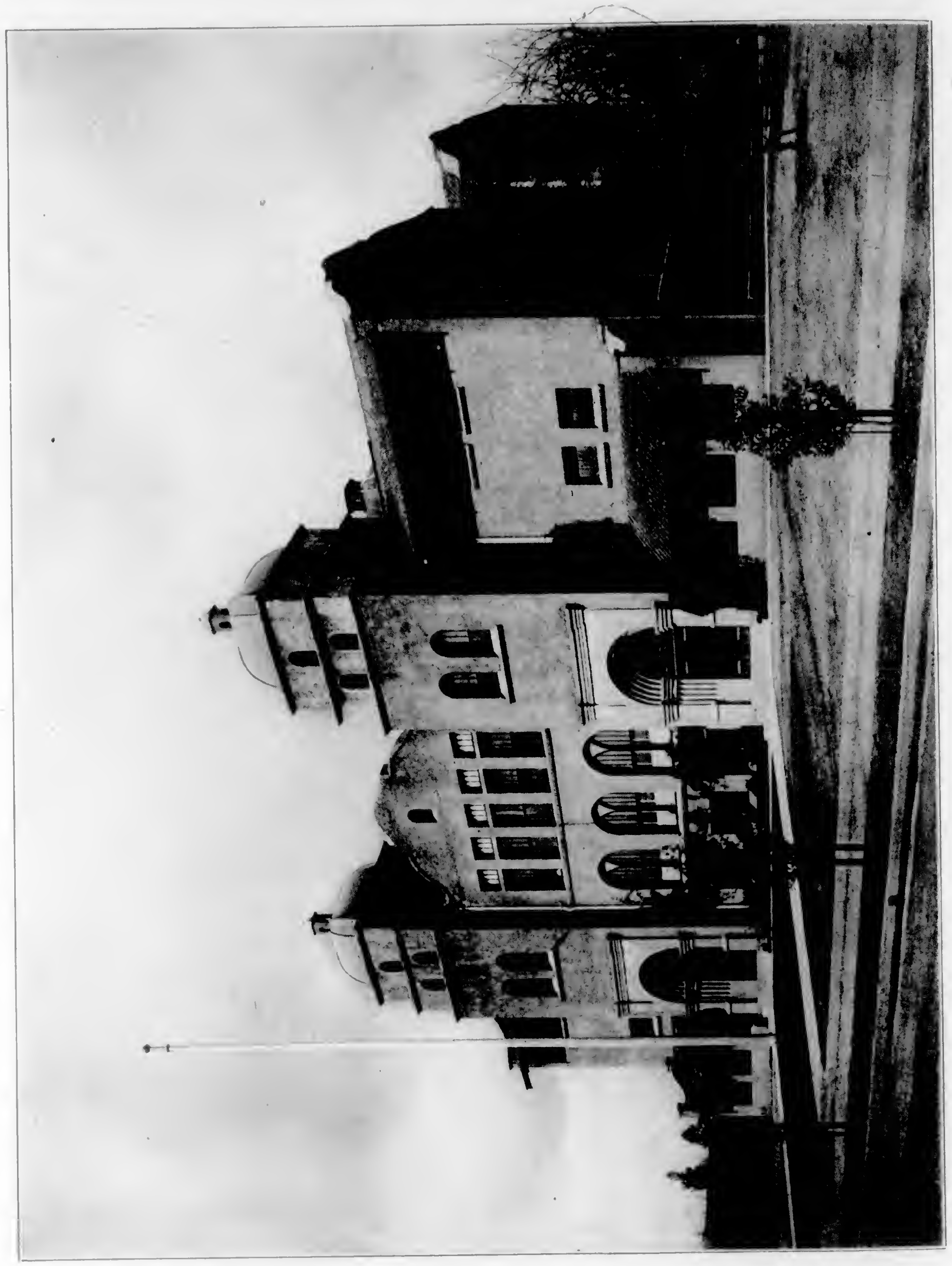
The Mission Type School House

THE popularity of the so-called Mission style of architecture continues, and with the increased demand for this type of building, architects are improving their designs materially. Some of the early efforts of the profession to produce something that resembled the work of California's pioneers were crude to say the least, and the pity of it is we must continue to look at these ugly specimens, doubtless for a long time to come.

For a while it seemed as if anything that could be thrown together with an exterior of plaster was styled Mission architecture. Of late, however, the tendency has been to improve upon the designs and at the same time keep in mind the main features of the Mission type, preserving the low, tiled roofs, the cool, inviting cloisters and the picturesque towers.

The Mission style has been found to be especially desirable for school house construction because of its adaptability to California climate and conditions. Most of the buildings of this type are built of wood, metal lath and cement plaster, which form an excellent combination against earthquake disturbances, and as the Mission buildings are seldom more than two stories high, they insure comparative safety for the pupils.

The several types of Mission school houses shown herewith were designed by Architect F. S. Allem of Pasadena and are creditable examples of what can be accomplished in Mission architecture.



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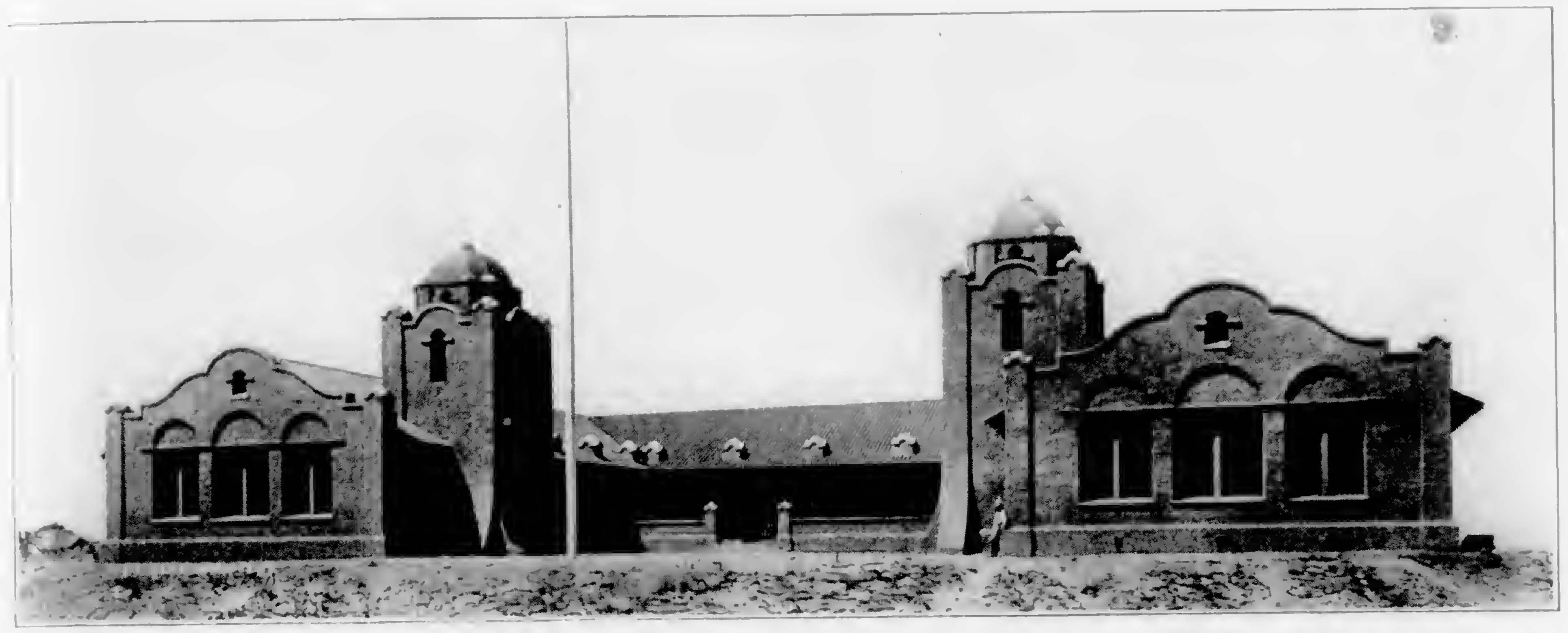

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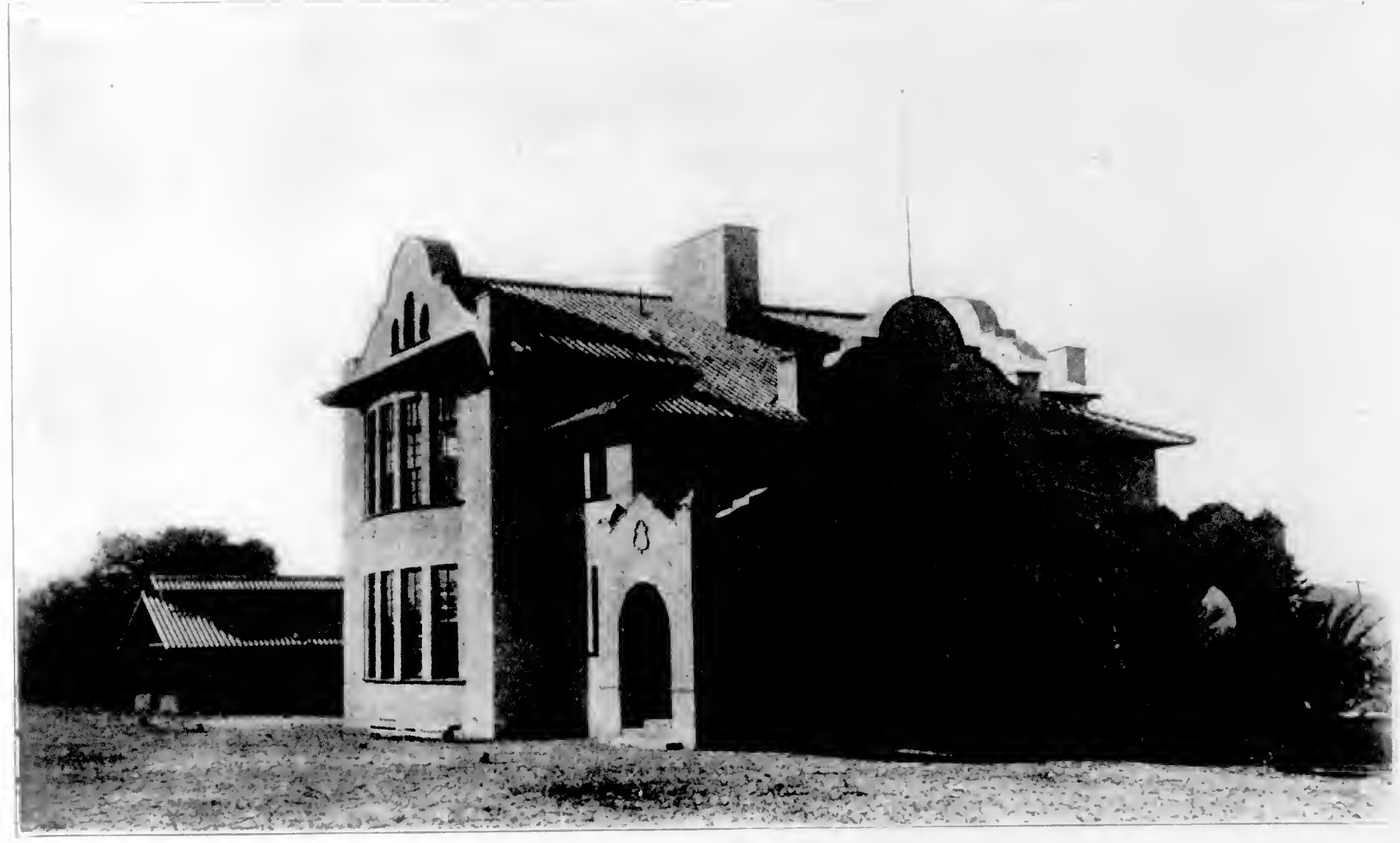

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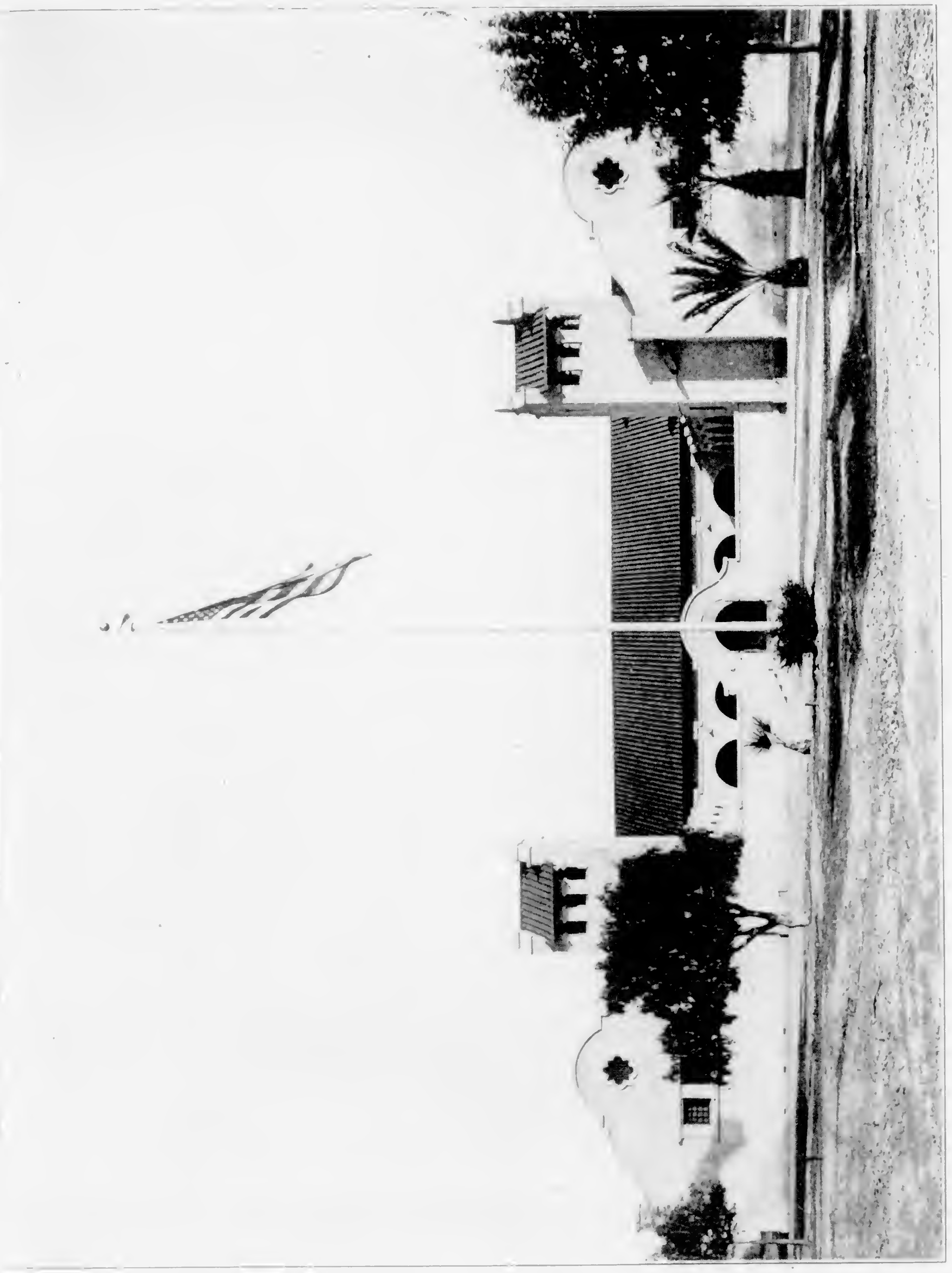
School at Banning, Cal. F. S. Allen, Architect



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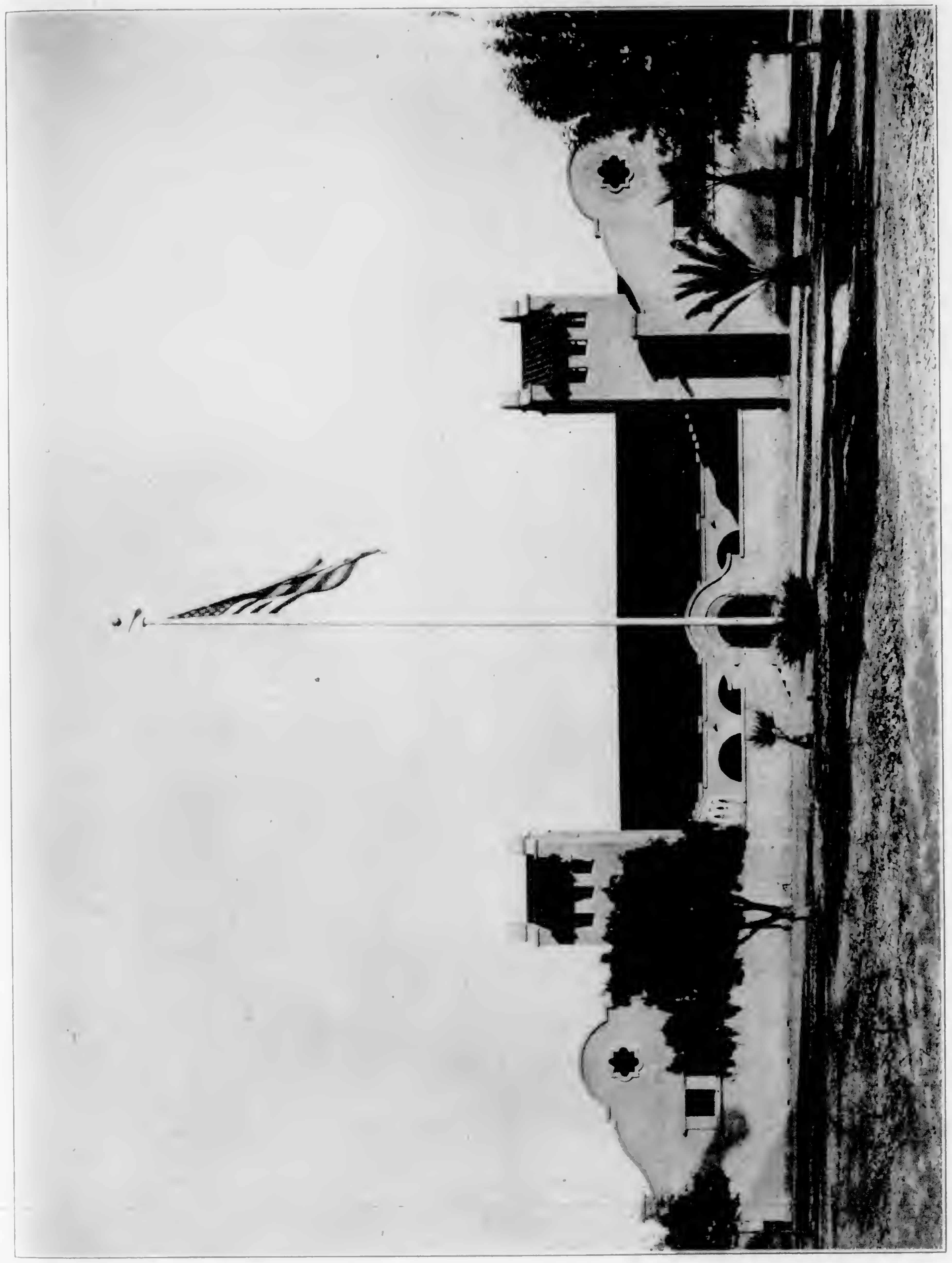

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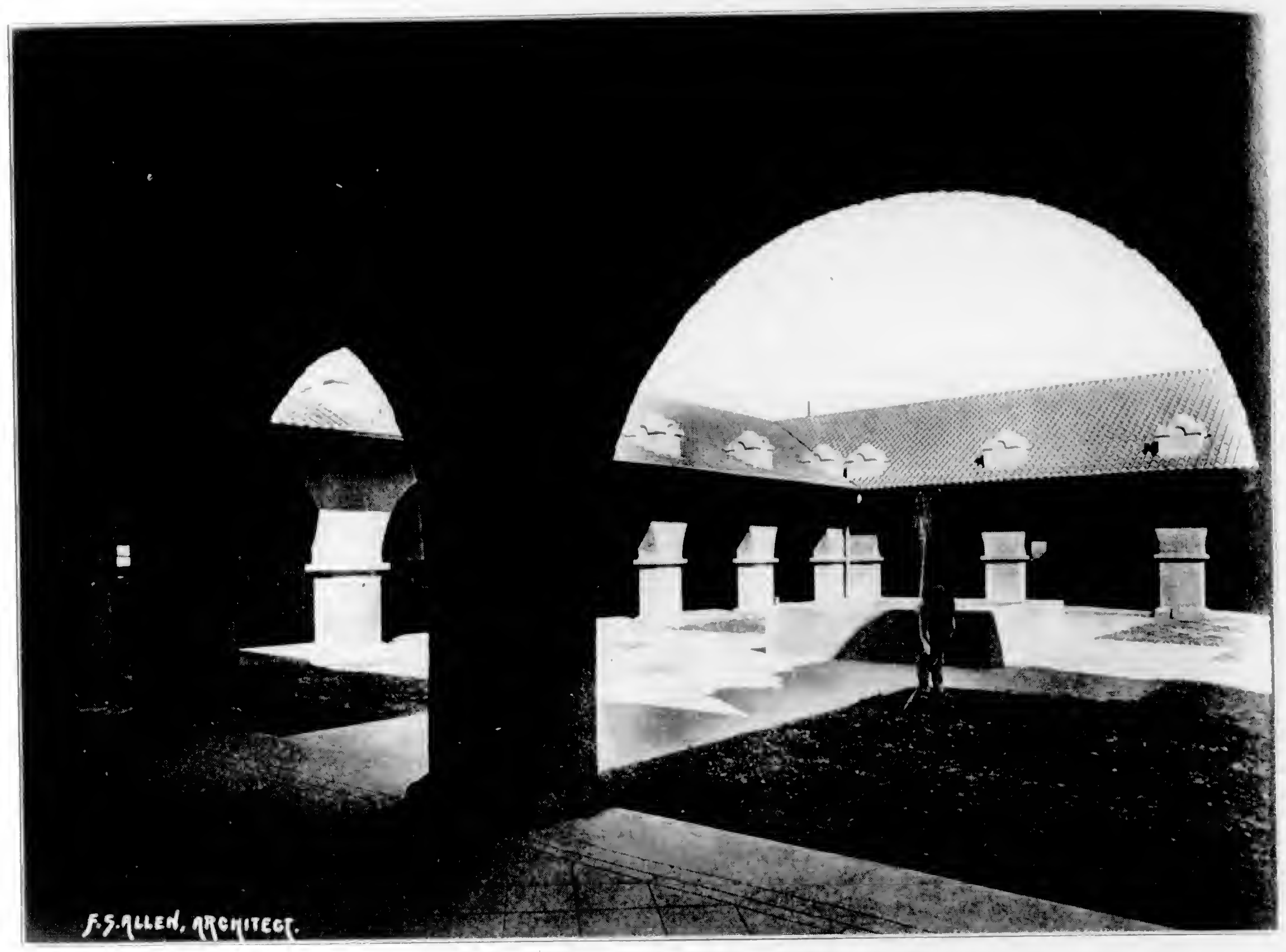
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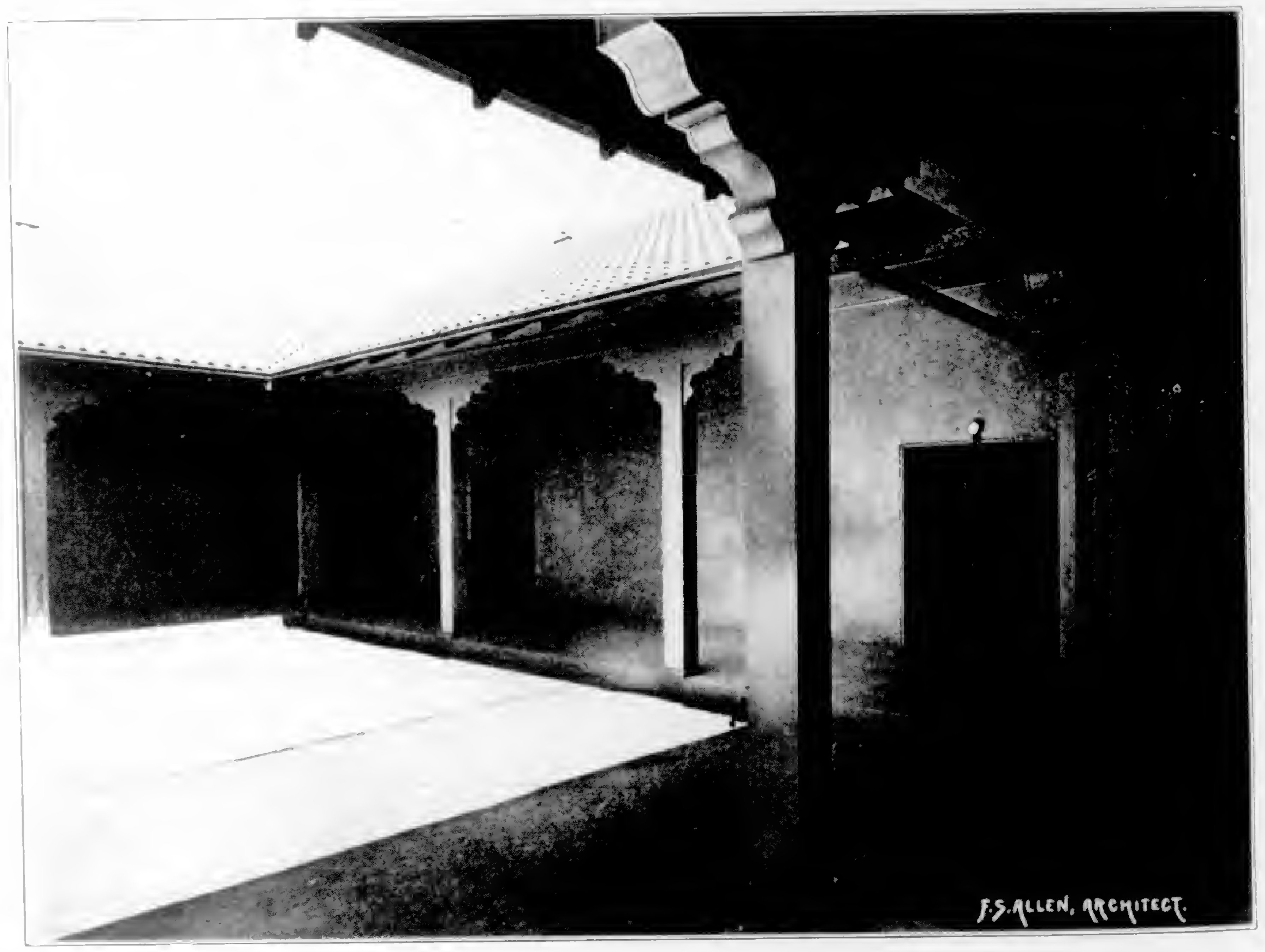
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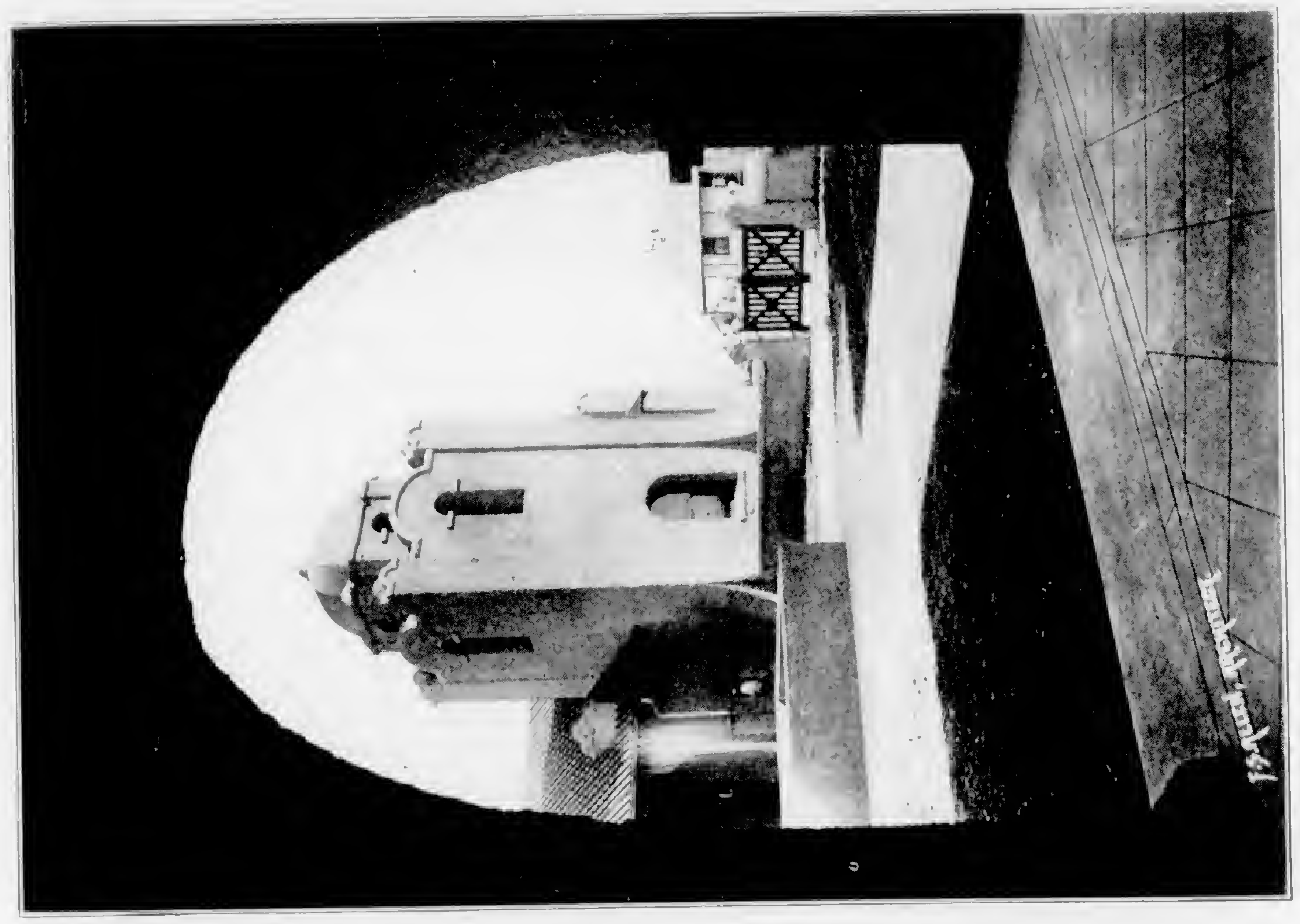

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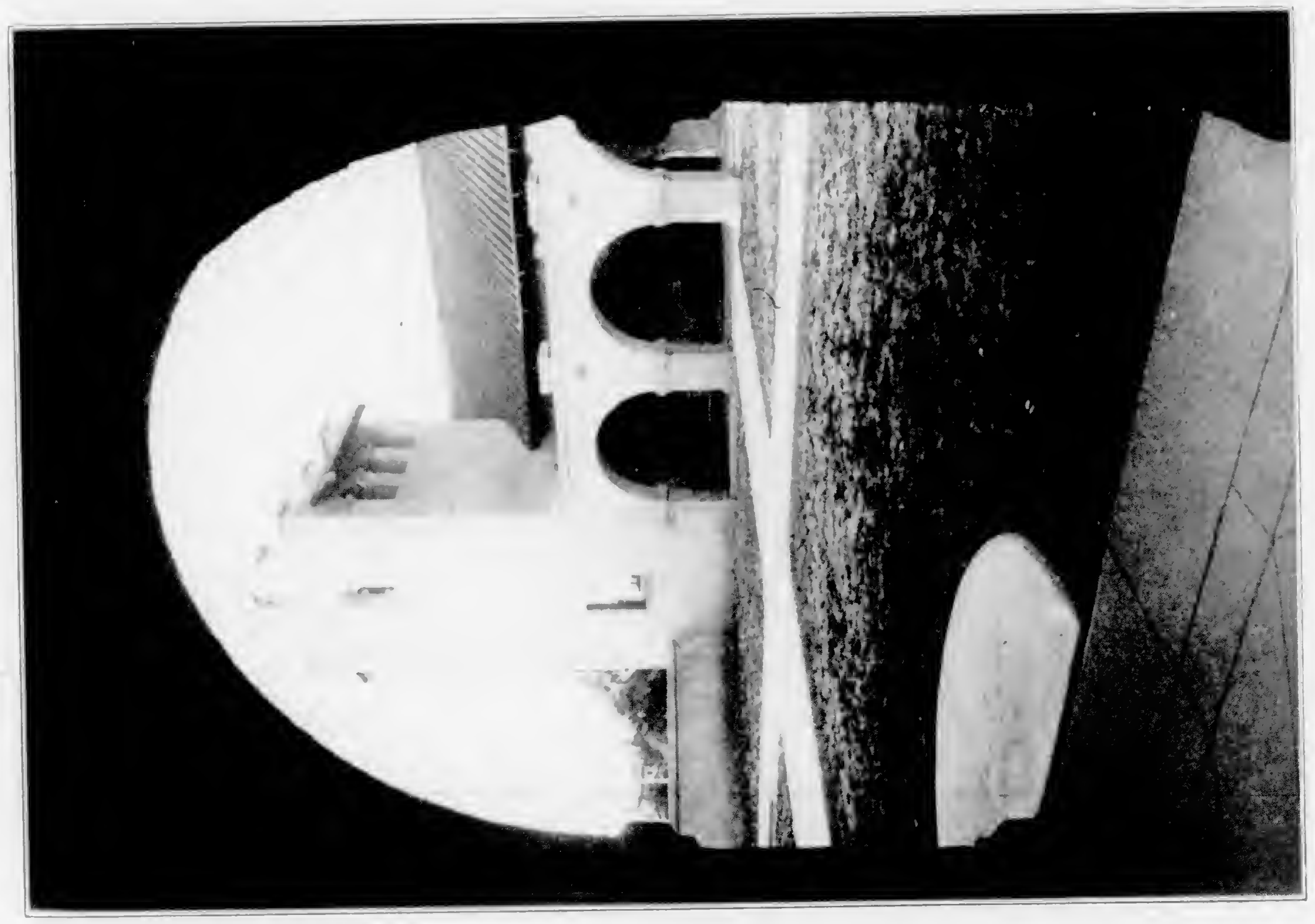

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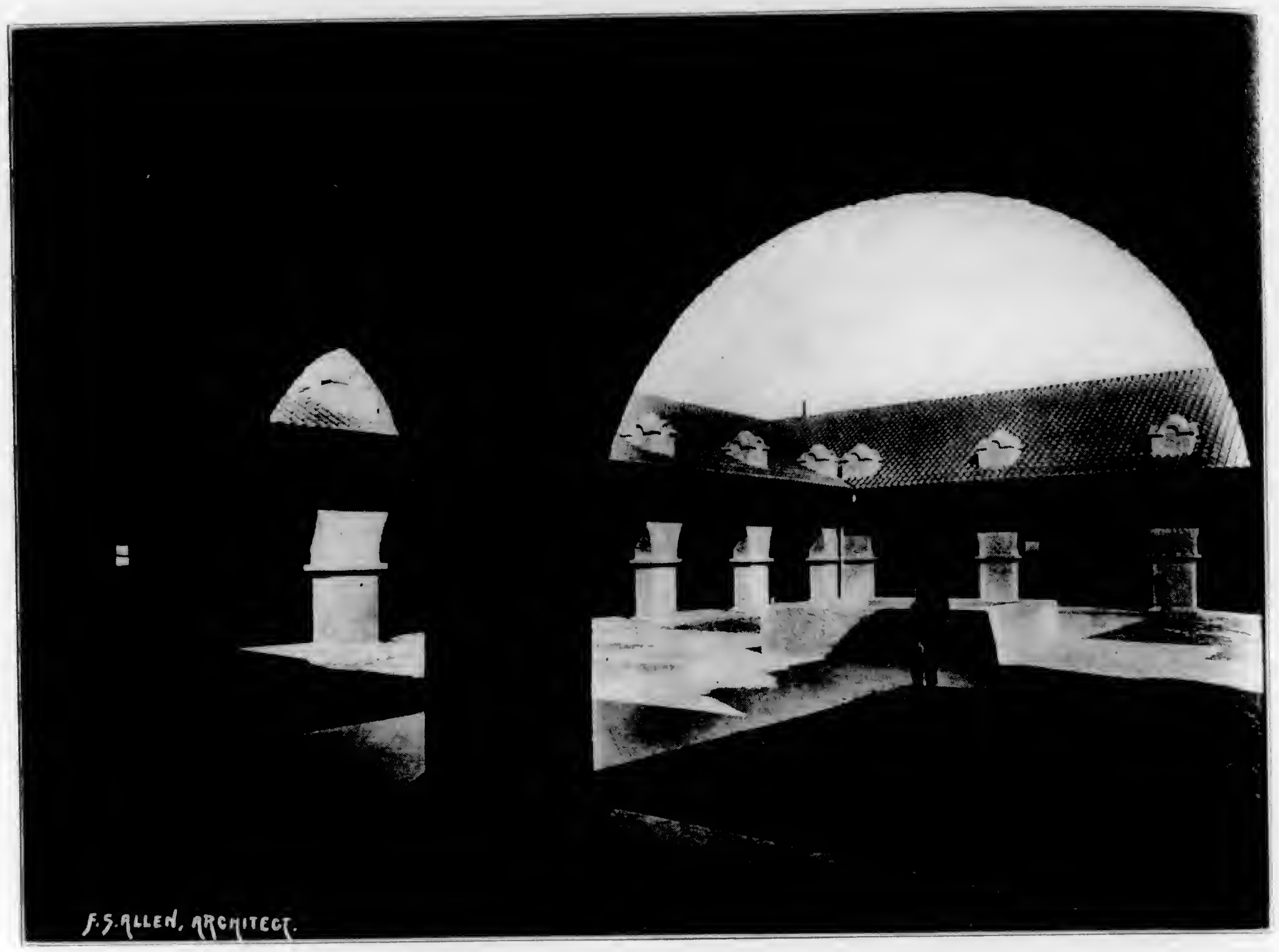
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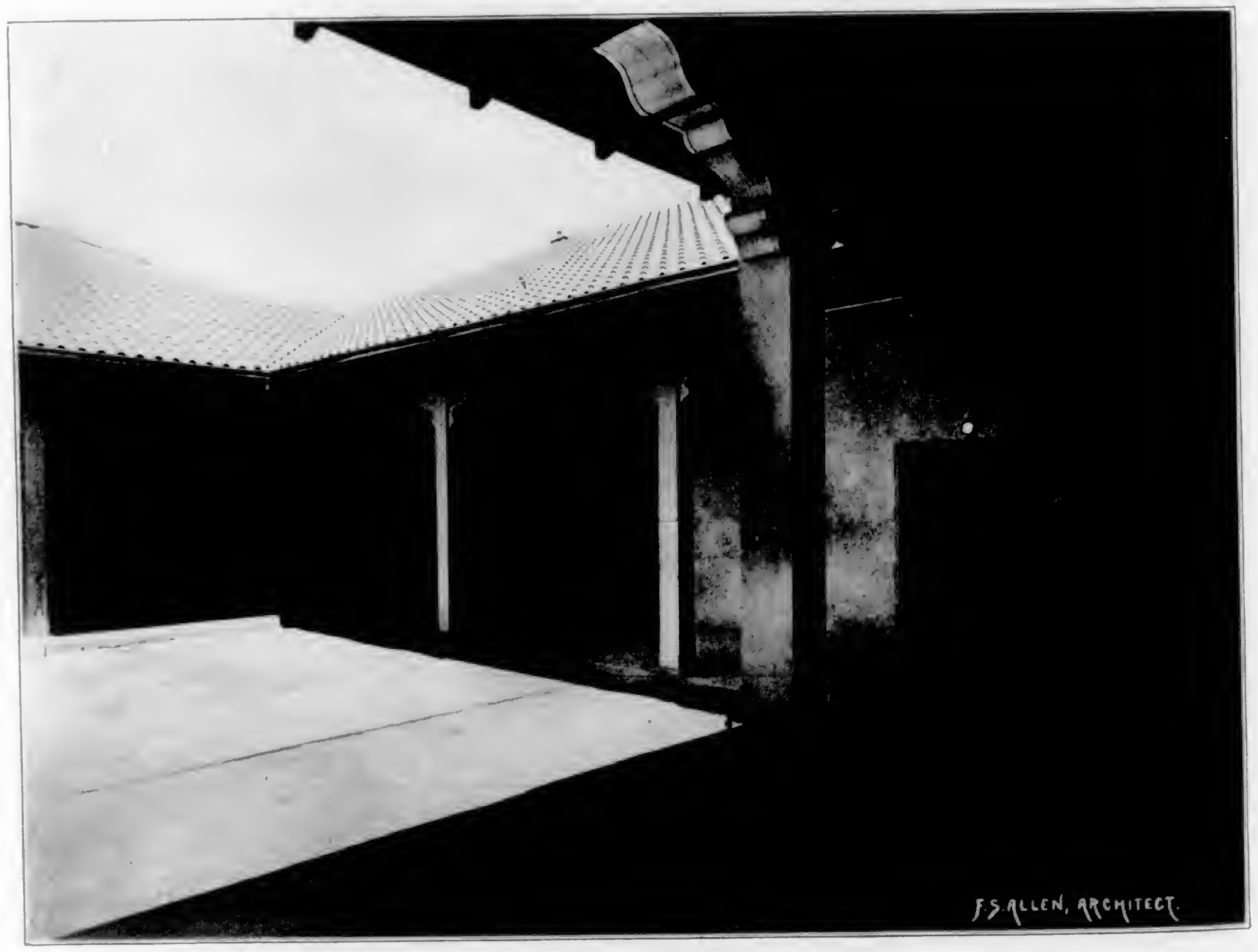
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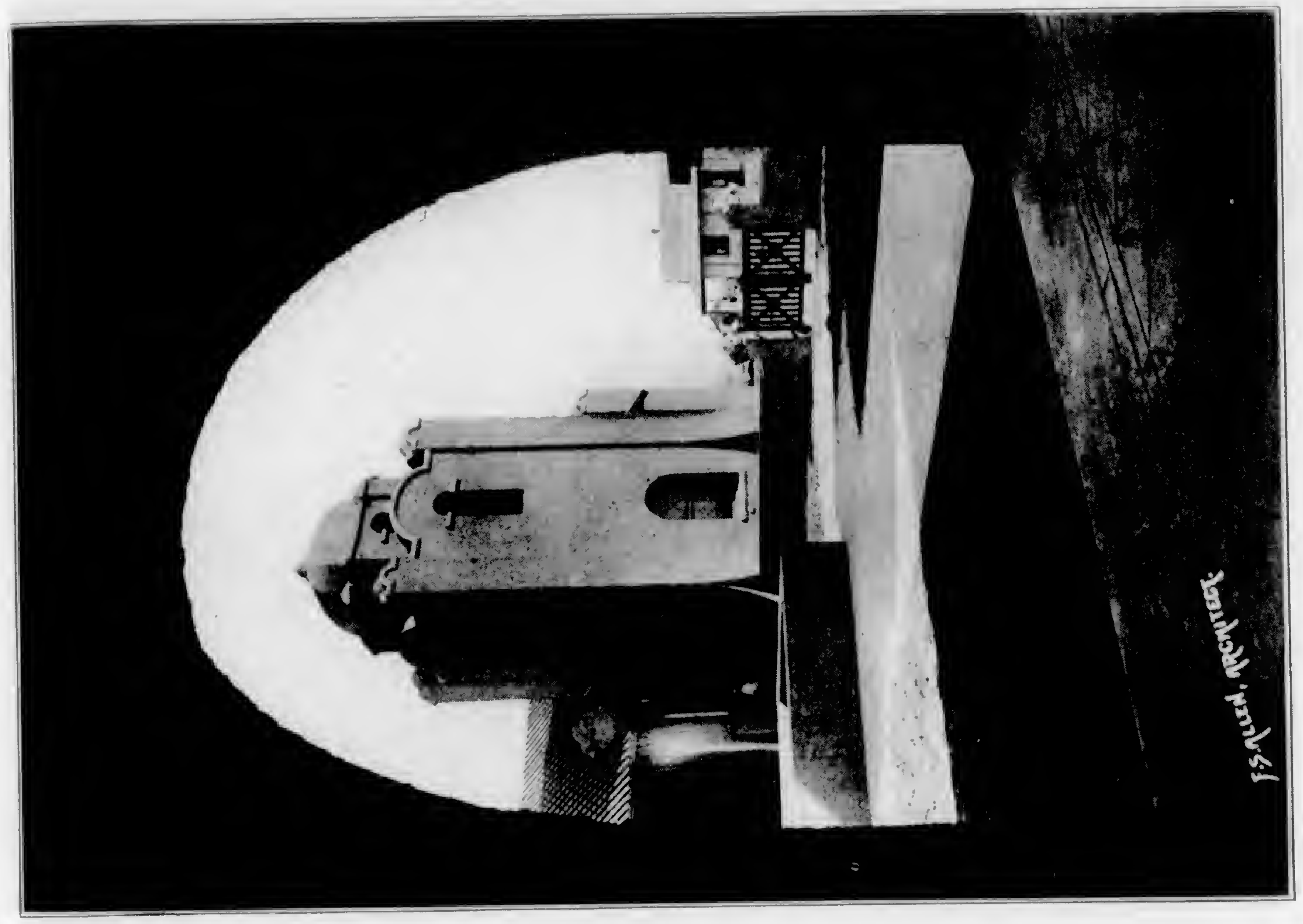
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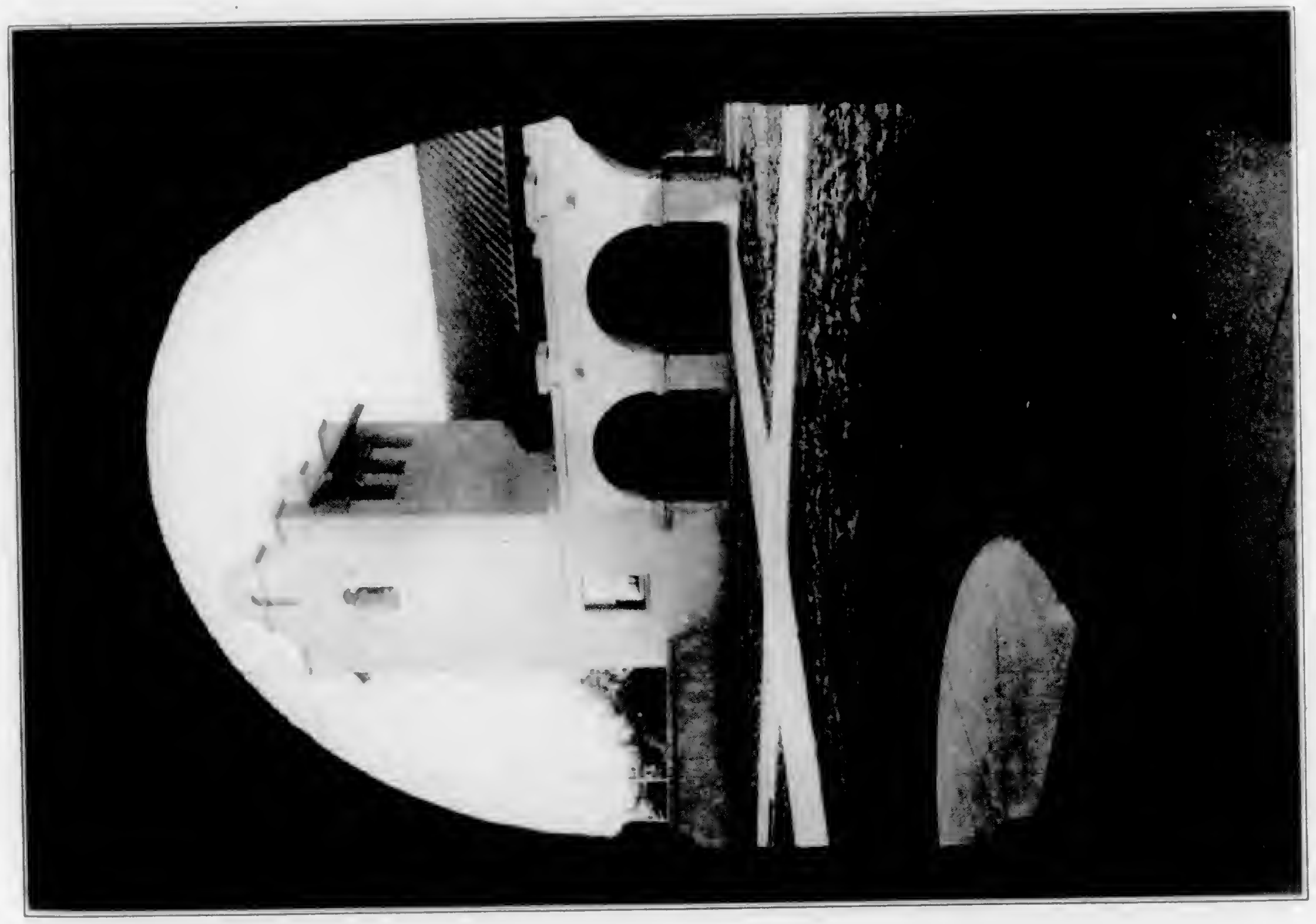

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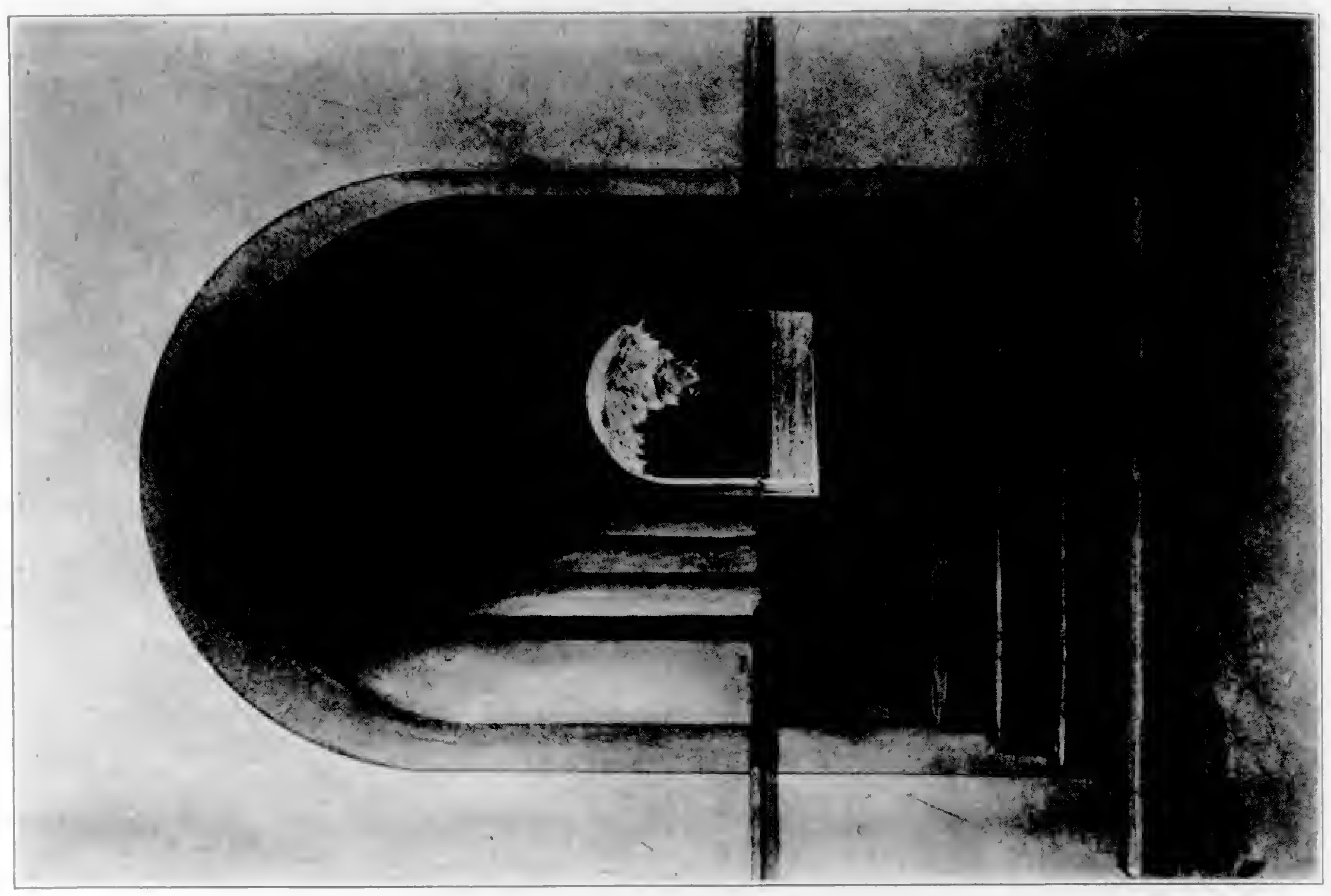
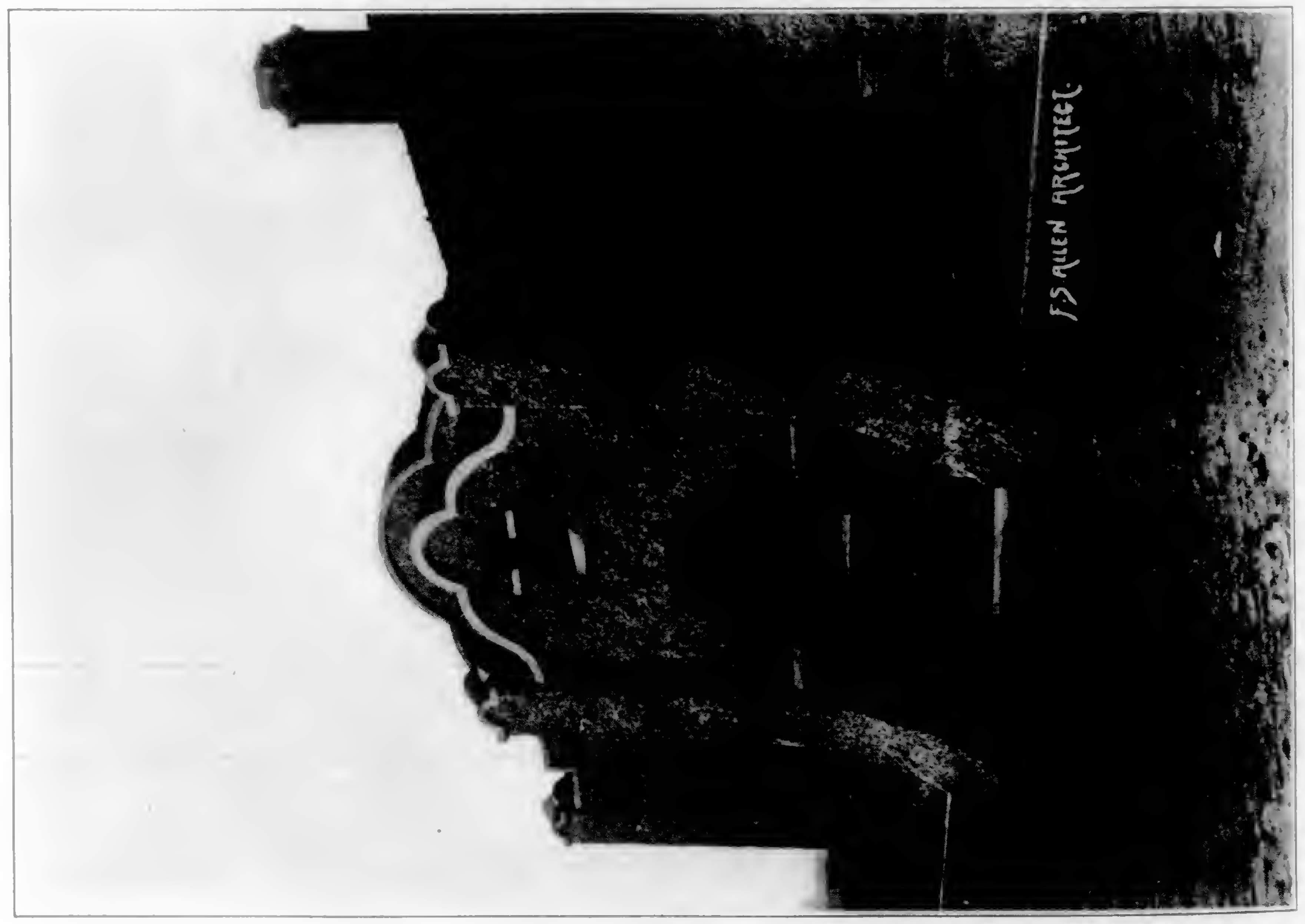
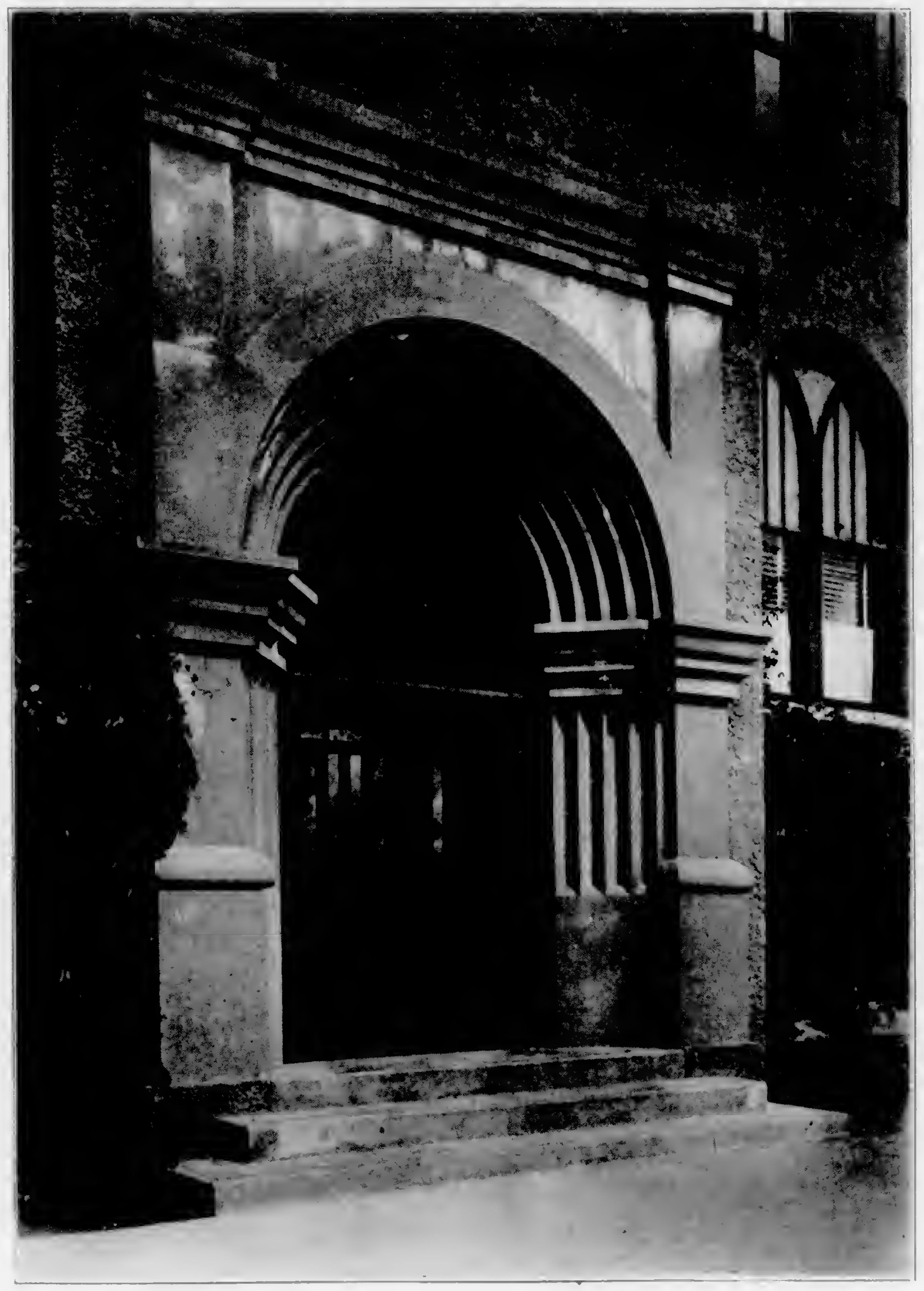


Cloister, School at Redlands F. S. Allen, Architect



Rear Entrance High School Yuma, Ariz. F. S. Allen, Architect



Entrance, Madison School, Pasadena, Cal.
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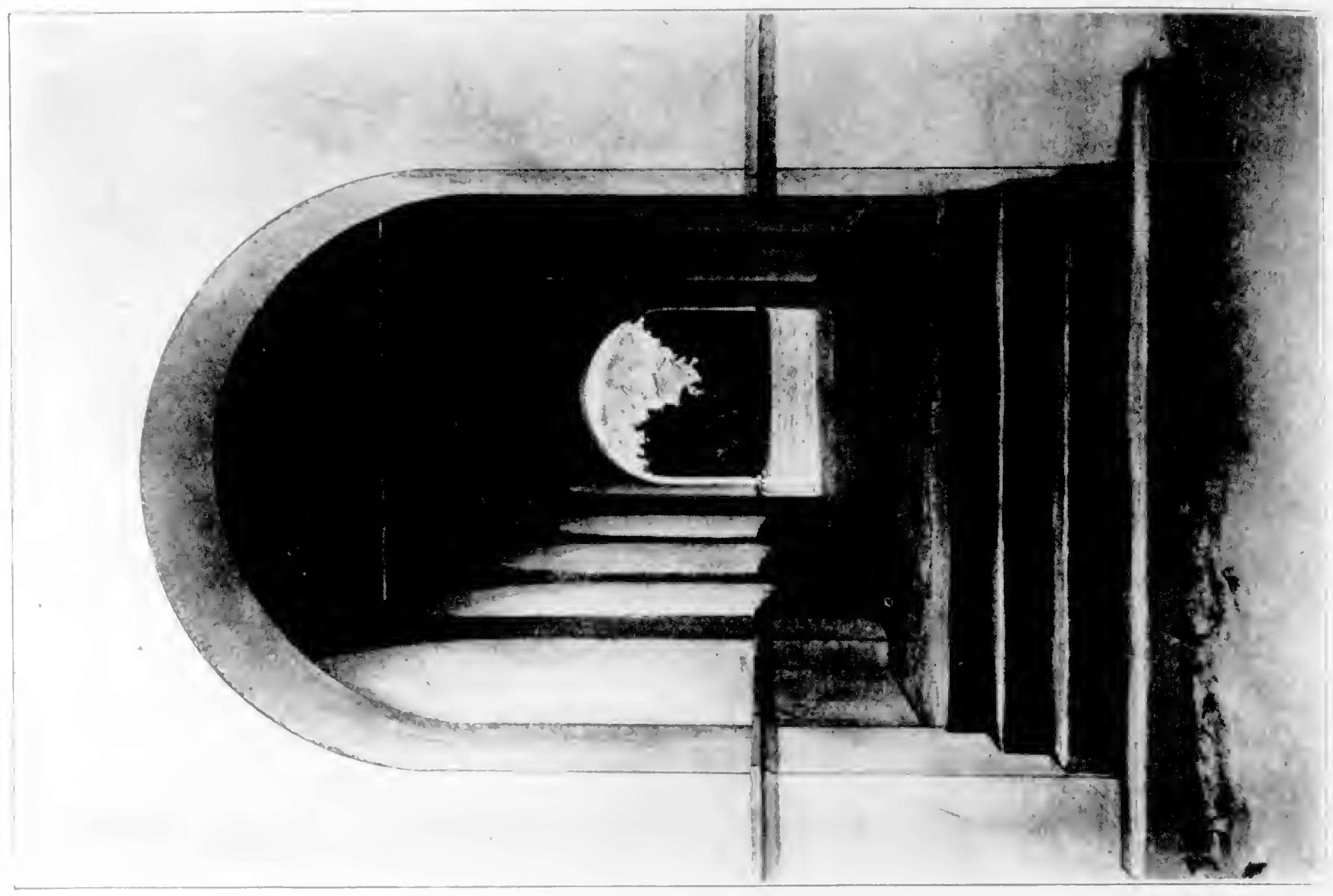

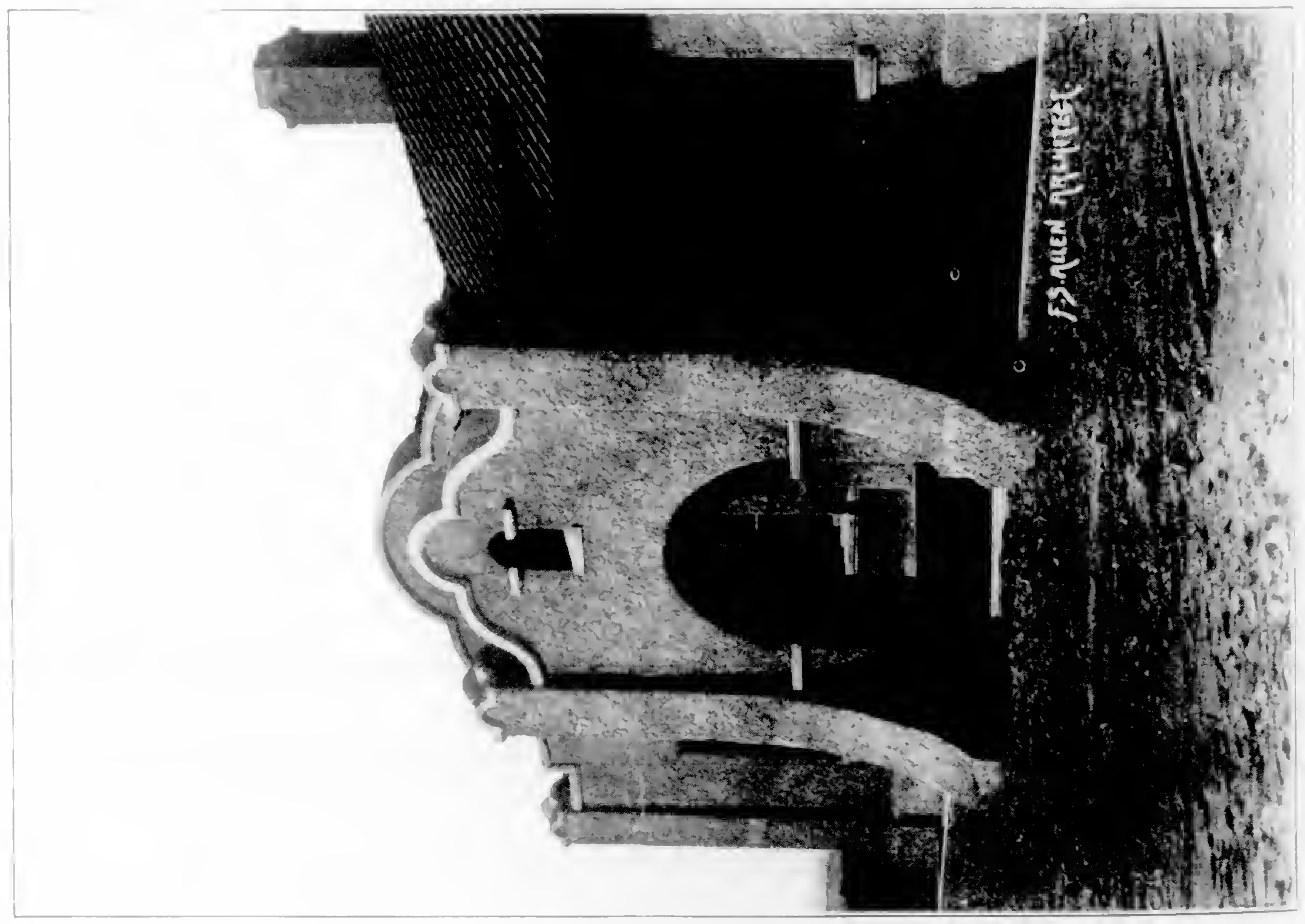
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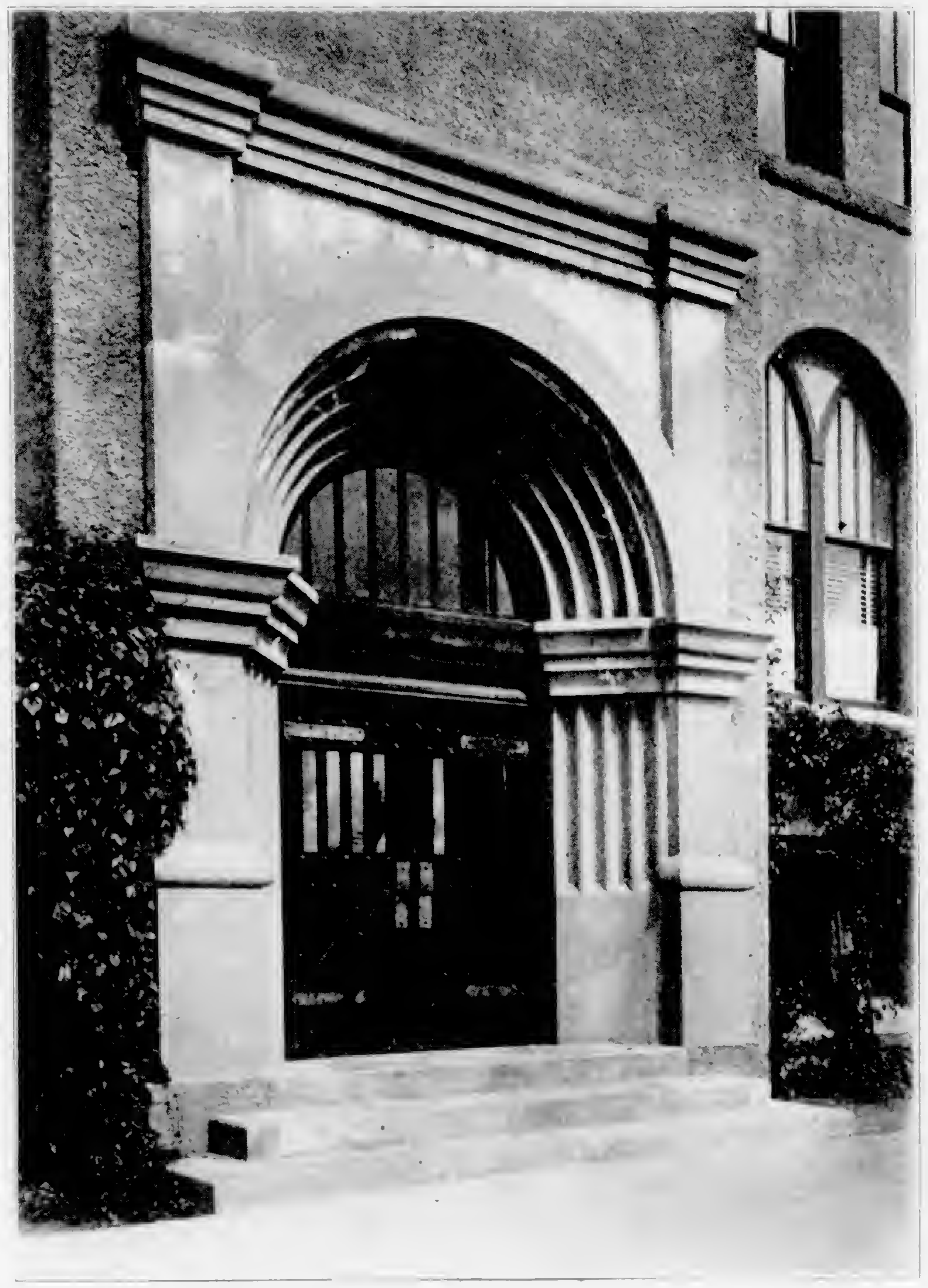

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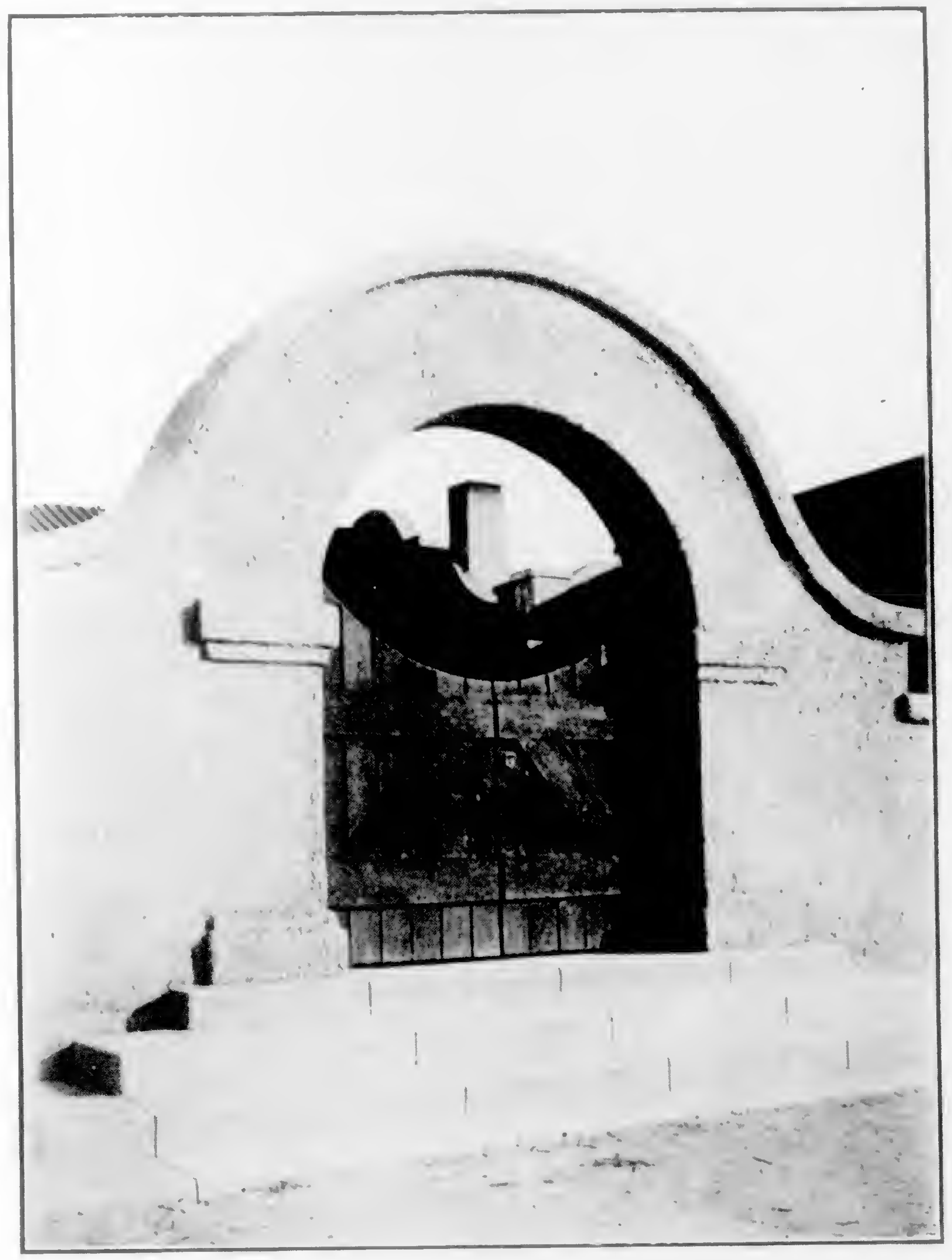

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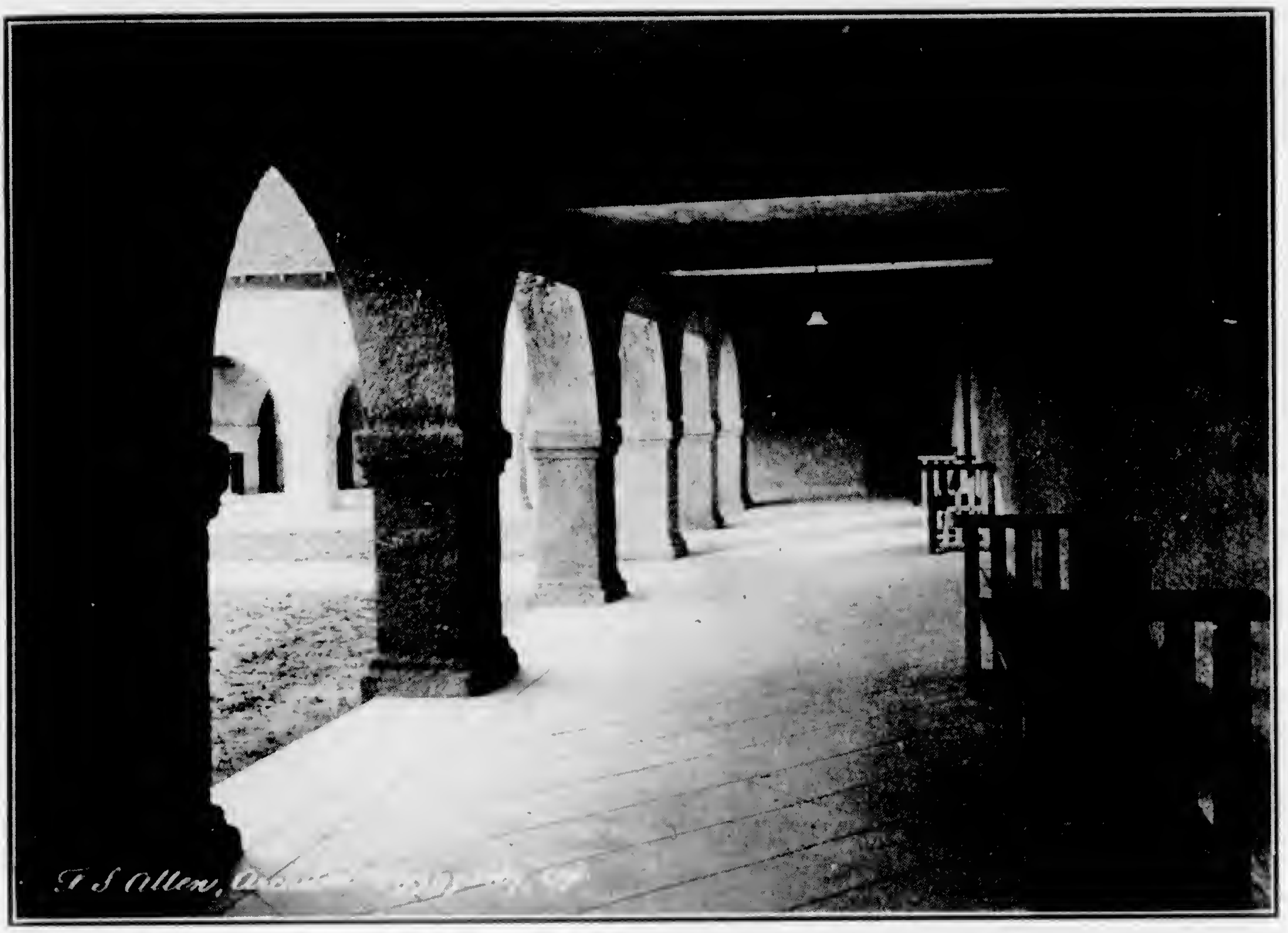


Cloister National City High School

London's Mammoth Hotel

The magnitude of the work of constructing the new Piccadilly Hotel, London, Eng., now in course of erection on the site of the old St. James' Hall and restaurant, with a frontage to Piccadilly and Regent street, may be gathered from the following facts and figures:

6,500,000 bricks have been used (enough to reach from London to Budapest if placed end to end).

60,000 cubic yards of earth were excavated for the foundations, which are 40 feet deep.

104,000 cubic feet of Portland stone.

4200 tons of Portland cement.

11,000 yards of wall-tiling.

7000 tons of iron and steel work.

8700 yards of asphalt flooring.

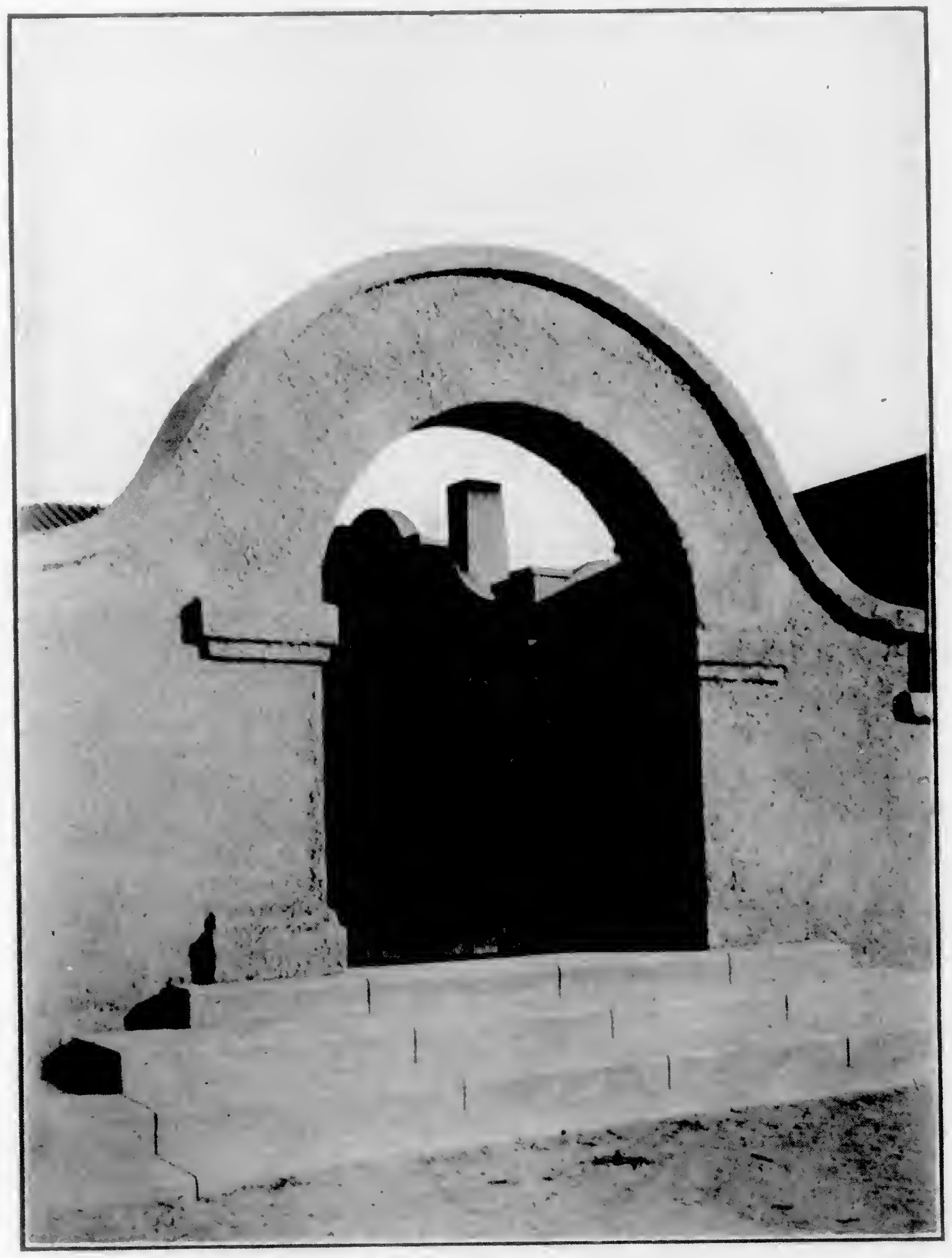
70 miles of electric bell wire.

200 miles of piping for lighting and heating.

90 miles of electric light and power cables.

10,000 electric lamps have been utilized in the course of the construction.

There are upwards of 700 bedrooms, while the hotel will be replete with all the luxuries looked for in an up-to-date, first-class hotel.



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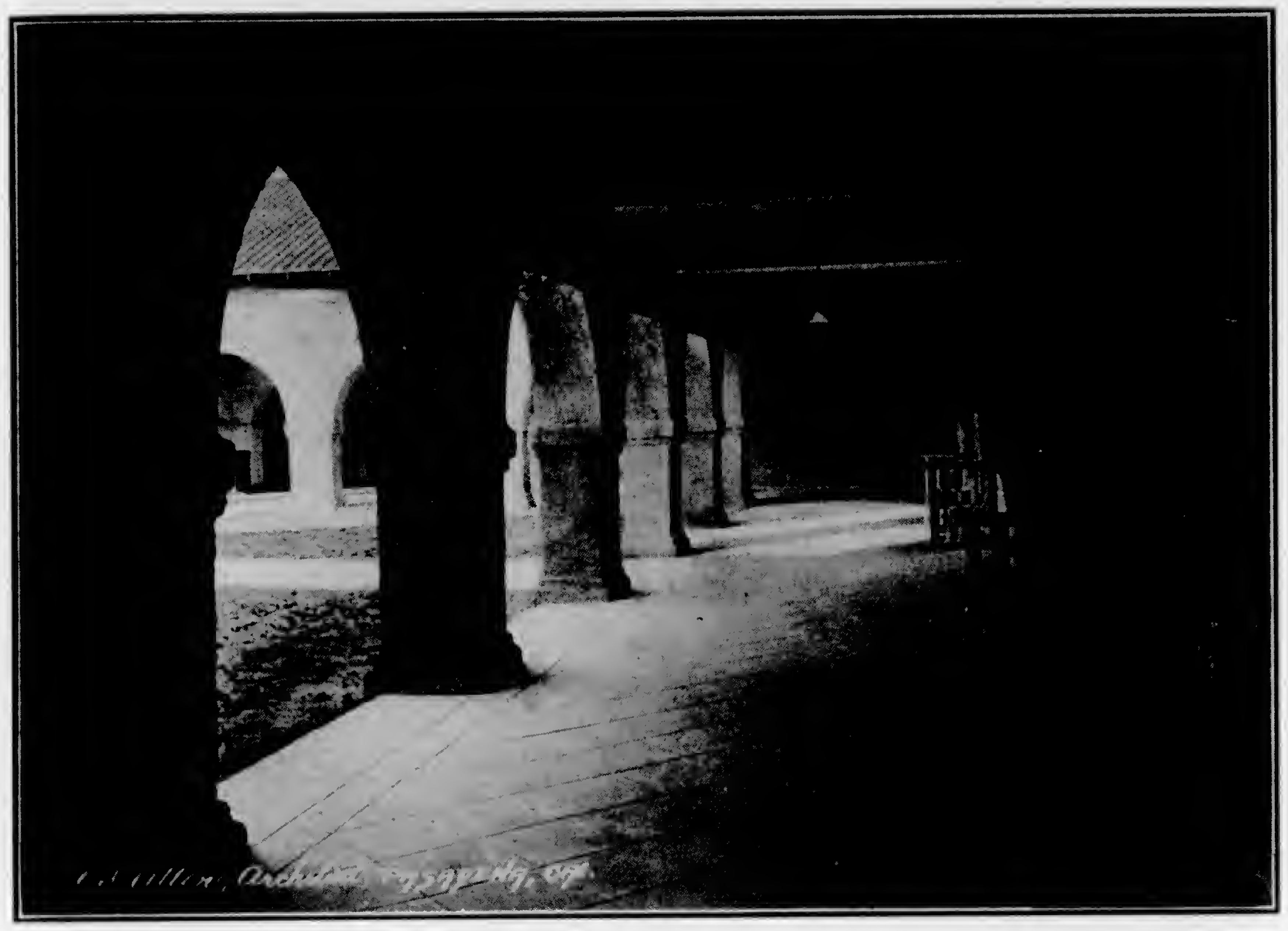

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More Anent the Catalogue Nuisance

By RICHARD S. REQUA, San Diego, Cal.

I READ with considerable interest Mr. Wallingford's article in the July number of the Architect and Engineer on the "Catalogue Nuisance," and it clearly brought to mind my catalogue experience as a specification writer. While I fully agree with Mr. Wallingford that catalogues of the present sizes and shapes are really a nuisance I would hesitate to suggest their wholesale destruction as a safe and sure relief.

My shelves are constantly piled full of manufacturers' publications of all shapes, conditions and sizes and in desperation I would frequently seize a pile from the collection and relegate them to the garbage can, but as certain as I did so, just so sure would I shortly have urgent need for them.

I was usually affected with weakness of the heart or an attack of that tired feeling whenever I commenced operation on the pile to find some special article for specifications.

Then there would be the restless and nervous client waiting impatiently in the outer office while I was wading through the conglomeration of miscellaneous manuscripts vainly seeking for the illusive article which the client was anxious to have included in his work.

But the storm has now subsided, the dark clouds have floated away and the sun peacefully shines on the calm, unruffled world, at least as far as the catalogue nuisance is concerned in this office. A vertical filing system has been procured capable of indefinite extension, each drawer holds approximately one hundred catalogues up to 10 by 12 inches. The catalogues are number consecutively as they are received, placed in a folder with the catalogue name and number written thereon and filed in the drawer, out of sight and dust. Two card indexes, one of manufacturer's name, and the other with an alphabetical arrangement of the manufactured goods serves to locate any particular catalogue at once, a shelf has been provided for the finishing hardware, plumbing, iron work and other bulky catalogues too large for the drawers. These are lettered and properly indexed with the other catalogues.

No investment that has been made in this office has brought such large and quick returns in saving of time, labor and disposition as has this vertical catalogue filing system.

* * *

Window Glass Advances

At a recent meeting of window glass manufactures, held in Pittsburg, another advance of ten per cent was decided upon, making an increase of nearly 30 per cent in the price of window glass within a few weeks, according to press reports, which are more or less reliable.

For the first time in many years the American Window Glass Company is operating during the summer season, and arrangements are being made to operate additional pots to meet the demand. The situation is causing uneasiness among window glass jobbers and it is stated officially that their stocks at present are much lower than for a number of years.

It is customary for manufacturers and jobbers to have not less than 2,000,000 boxes of window glass on hand at this time of the year. It is stated officially that there are less than 700,000 boxes of window glass on the market at present, and to meet the demand, even at the advanced prices, it will be necessary to resume operation immediately at many plants.

Build Now and Build Well

By F. W. FITZPATRICK, Architect.

Mr. Fitzpatrick has joined in the movement which seems to prevail quite universally just now for the immediate resumption of building activity. In San Francisco the dull season has been of shorter duration than elsewhere, due undoubtedly to the fact that there is so much building yet to be done before the city will have been completely restored. It is one of the best indications we could have of a returning prosperity—this movement to build now—and it is hoped that it will serve to restore confidence and encourage the more conservative ones to unburden themselves of their accumulated wealth and place more of it in circulation. Mr. Fitzpatrick tells us some of the many reasons why those contemplating building should take full advantage of the present tendency toward lower prices, and, as usual, he gives some striking statistics, which help wonderfully to sustain his arguments.—THE EDITOR.

IN BUILDING as in everything else, we mortals don't always show the very top-notch of good sense, for when prices are highest the demand is greatest and of course, it's the big demand that makes the high prices, and being more or less like sheep any way, it's only when we see the other fellow building and paying extra high prices that we get warmed up and fearing some unknown evil or other, we rush in and want some, too!

That's the way it's generally done; but one would think that shrewd business men would see the opportunity and realize the advantage of "buying on a low market" and get busy and build all they can now. Incidentally if they did, it would be the very thing that would most expedite the return of flush, busy, high-priced times.

All must appreciate that we can not stand still; the soft pedal that has been on for a few months will soon give way to the "crescendo" or whatever it is that swells up the tone. Business is bound to boom and before many moons. Crops have been bountiful, banks are loaded with money and the political uneasiness will shortly be over. That there is money enough for people to "make hay while the sun shines," as it were, is proven by the fact that investors have awakened to their chances and are buying stocks. The staple stocks that a year or so ago were owned by only hundreds of big holders are today scattered to thousands of smaller investors—one of the best things that could happen to us. Besides, and a most peculiar coincidence if nothing more, all through the panicky times and when business buildings and even houses were at lowest ebb, as far as building them was concerned, churches, masonic temples and schools, and such buildings were being erected, not at the same old rate as before, but actually more of them than in the previous good times! One would naturally think that if the bottom were really out of everything, men would cut down their subscriptions to churches, etc., the first thing. But they did not. And that indicated the confidence our people must have had in the future.

A wonder, indeed, that that confidence did not extend to other forms of building, remunerative, productive, profitable building. But we are shaking off our lethargy somewhat. For example, the falling off in building from January 1 to July 1, this year, as compared with the same period of 1907 was 39 per cent. Or in figures the total expended in that time was $194,419,475, as against $322,229,291 for 1907. So much for the full six months, but note that the figures for June alone are $54,472,130 in 1908 and $64,825,001 in 1907, or a loss of only 15 per cent. Better still, take New York City,—the pulse of the country we can call it,—the falling off for six months was 42 per cent, while its building for June, 1908, was $20,449,027, or only 13 per cent less than June, 1907.

Building of all kinds is on the increase and a rapid one. Railroads that had suspended improvements have resumed them. Over $180,000,000 had been appropriated for such work two months ago and the movement still continues. The government is placing contracts for all sorts of work now and at almost a furious rate. Congress was liberal in public buildings and they are being "ground-out" at high speed. Something like $195,000,000 has just changed hands, been paid by the great "Interests" in dividends and regular "annuals" on stocks, bonds, etc.—turned into proper channels, circulated. Why, bless you, it's only a question of months if not indeed but weeks, before building will be on its old booming basis.

There is still time, but none to spare, for the wise business man, to wake up and close whatever deals they may have in mind in the building line. Indeed it would be most wise to make contracts for buildings that are not needed immediately. The percentage of saving will far exceed the loss of possible unoccupancy.

The peculiar thing about it is that building materials themselves have not been greatly reduced by the slump in general business last October, nor have the unions lowered the wage-rates. But workmen are not quite so independent, there is greater selection exercised in making up the smaller crews now required and the men, knowing that they are not so much in demand work with greater vim. More by far is accomplished than used to be the order of the day in top-notch times. The principal cause of low prices, however, lies in the fact that contractors are more anxious for work, to keep going, to turn their money over, and consequently figure upon a lower basis, and smaller margin of profit than when everything is rushing. Let me cite you some instances as examples of the difference between "tweedle-dee and tweedle-dum." I have especial advantages in being able to keep in close touch with varying conditions. In my consultation practice I have the most intimate relations with architects all over the country, and through them and through the building departments of all our cities, have access to the most intimate and complete data upon that and related subjects and away in advance of the newspapers or other such agencies, so know whereof I speak. True, contractors' bids do not always indicate the exact cost of a building, for they will range 50 and even 80 per cent difference between the highest and the lowest, but after all, if made by responsible contractors, they create a basis or standard of cost, and certainly serve as our only available authoritative basis of comparison of cost.

Well, here's a case of a warehouse for which plans were made just a year ago. Bids ran at that time from $216,000 down to $147,000, but the owners deemed even the lowest too high. This was in the middle west. In May this year the same plans without change, were put out for figures and the bids ran from $193,000 to $114,800, and a contract was closed for a little less than that last named sum after making some slight changes. Another instance: An office building in the east, planned and figured last September, lowest bid $123,400, deemed too high, refigured on same basis this last June and let for $102,000. Still another, and indicating the upward tendency again, the only case I have in mind that illustrates that feature of the subject. An association building in the south, lowest bid in September, $346,000, refigured in May, with lowest, on same basis, of $275,000, but again delayed and figured anew just a few weeks ago, the same lowest bidder this time making his estimate $289,000! In the smaller work the difference is as noticeable. Here's a store building in a coast city, and of course always on the same plans and basis, the lowest bid last May $27,000, the lowest last month $21,000; a row of houses in an eastern city estimated last July at $8,580 each and this last month at $6,860. As before stated, contractors' bids are more or less of a gamble, there's always a wide difference in them and one that should not reasonably exist with as constant quantities to cope with as labor and building materials, but there can be no mistake in sizing up the situation by comparing the estimates of the lowest in each case and of both periods. And mark you, these are but three or four instances out of possibly a hundred that have come to my knowledge, and all without a single exception, showing a marked decrease of cost now. Though, naturally, I have cited you the most marked differences, I do not wish it understood that everyone was an example of 40 per cent or more saved. But I can say that, averaged up, the cases that were thus clearly put before me, denoted a general reduction of from 12 to 20 per cent.

Assuming that 12 per cent is the maximum saving on what would have had to be invested a year ago or will have to be invested six months hence, it would hardly seem as if we would need to advance any greater argument to persuade the business man to get busy. That represents a full year's net maximum revenue on a commercial building, just as if he had had the building a year and without the expense and bother of repairs, fussing with tenants and all that sort of thing.

And now then let me reiterate another bit of advice. Build now and build well. Build even your houses fireproof. Even though the initial cost may be a wee bit greater than if built the old inflammable way, you'll save perhaps another 12 per cent in that building cost in a very few years. Better than that, your ideas must indeed be queer if you intend to build "temporarily" enough to make the matter of inferior construction attractive. And assuming that what you do build will have served its purpose in twenty-five years (that's about as long as folks let buildings stand down town, then they rip them up and start off on a 40, 60 or 100 story basis). Your fireproof building, considering lessened repairs, insurance premiums, etc., will have netted a total investment of something like 38 per cent less than what you would have had to put into an "ordinary" building. Meantime it would have also presented an infinitely better appearance, held its own better against the new comers, attracted a better class of tenants and been better for you in every respect. Thus leaving personal satisfaction and pride out of the question as being "inestimable" the actual advantages in dollars and cents value would be, everything considered, in the 25 years' time, something like 73 per cent! So that who, in Heaven's name, with two ounces of grey matter in his noodle, would dare look an intelligent man in the face and tell him that cheap building is economical! And so for my "finally" or "lastly" let me exhort my readers to build well at any time, and if they want to save still more money then let them by all means build now.

* * *

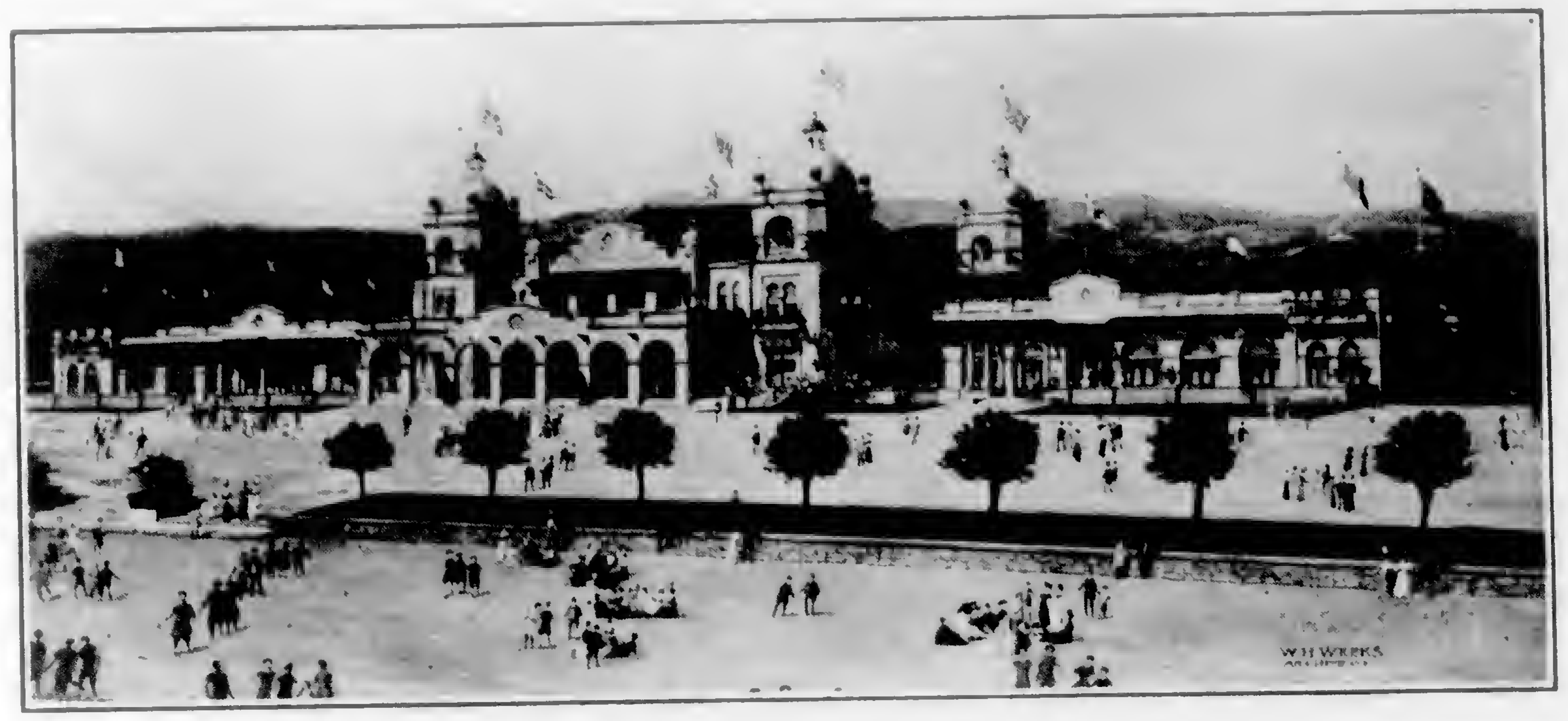
Signs

The enterprising manager of a little lyric theater in northern Pennsylvania believes in profiting by the misfortunes of others. One day he displayed the following sign in his house:

DO NOT SMOKE
REMEMBER THE IROQUOIS FIRE

So great was the efficacy of this that before the end of the week he put up another:

DO NOT SPIT
REMEMBER THE JOHNSTOWN FLOOD



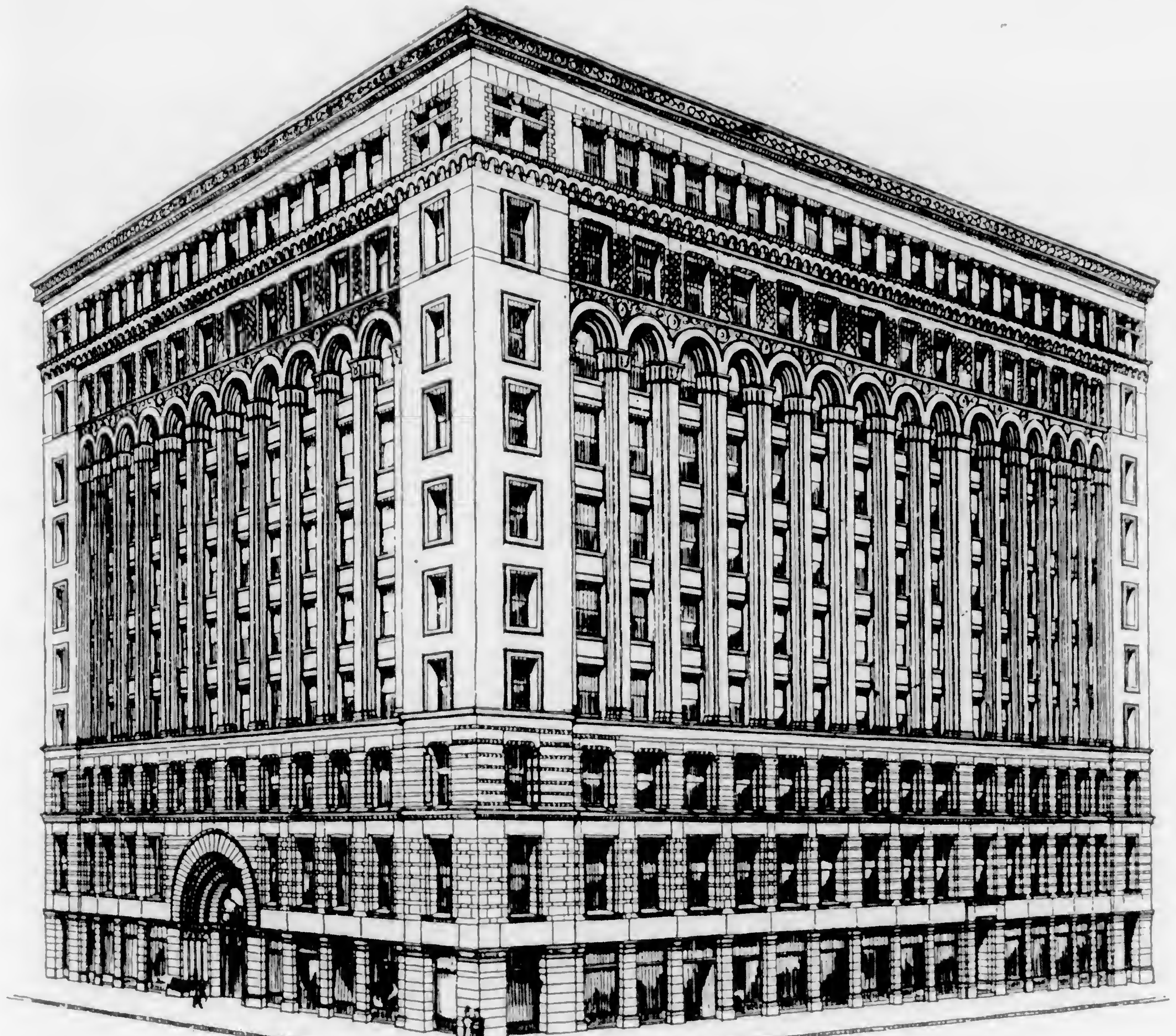
Design for Casino at Monterey. William H. Weeks, Architect

Fire

By F. W. FITZPATRICK, Architect

THAT the press of the country is awakening to the fact that this is indeed the land of fire augurs well for the prospects of some drastic action being taken ultimately on behalf of fire-prevention, but the lay press as well as the layman is still lamentably uninformed as to the real status of this fire matter. For instance, the "Outlook," an exceptionally well-posted journal, comments recently and editorially upon the "Land of Fire," and cites some of the great conflagrations of the world since 1835 and says of New York that that city "since 1835 has been singularly fortunate in having had no great fires, and in this respect, therefore, may be said to be on a par with great European cities." The "Outlook" undoubtedly means that since that year New York has had no fires that wiped out any great section of the city at one fell swoop, but it will yet be a long time before we can speak of New York and the great European cities as being anywhere nearly comparable. That city's fire loss, while below the general average of that of the country, is still in the neighborhood of $2.00 per capita per annum, or $7,568,666 of damage in 12,182 fires in a year's time. In the same period London had but 3843 fires with a population half as much again as New York's. In all of the British kingdom in that same period there was but one fire of $300,000 and only 35 of over $50,000, and all of these 35 fires of over $50,000 only equalled $3,785,000 in the year's time and that for a population of over 41,000,000 people, while New York, with a little over 4,000,000 people had one fire of nearly $5,000,000 and quite a number of over $100,000.

Commenting upon this fire matter, the "Outlook" further says that there is probably some truth in the supposition that we pay less attention to regulations intended to prevent fires, that buildings are of more combustible materials, and that our fire departments are less effective. As a matter of fact, our fire departments are the best in the world—they get the most practice and experience! The one great trouble is that we persist in building of inflammable construction, we have the habit, and our authorities, generally speaking, have not the backbone to break us of that habit by stringent enough regulations. There is no supposition about this thing, it is a patent, tangible, demonstrable fact. And it is the province of the technical journals to so thoroughly emphasize the point that we have in the past and are now building too much shoddy construction that the daily press, the lay journals, will follow suit and eventually the people themselves will grasp the idea and help in the reform that is so very, very necessary.

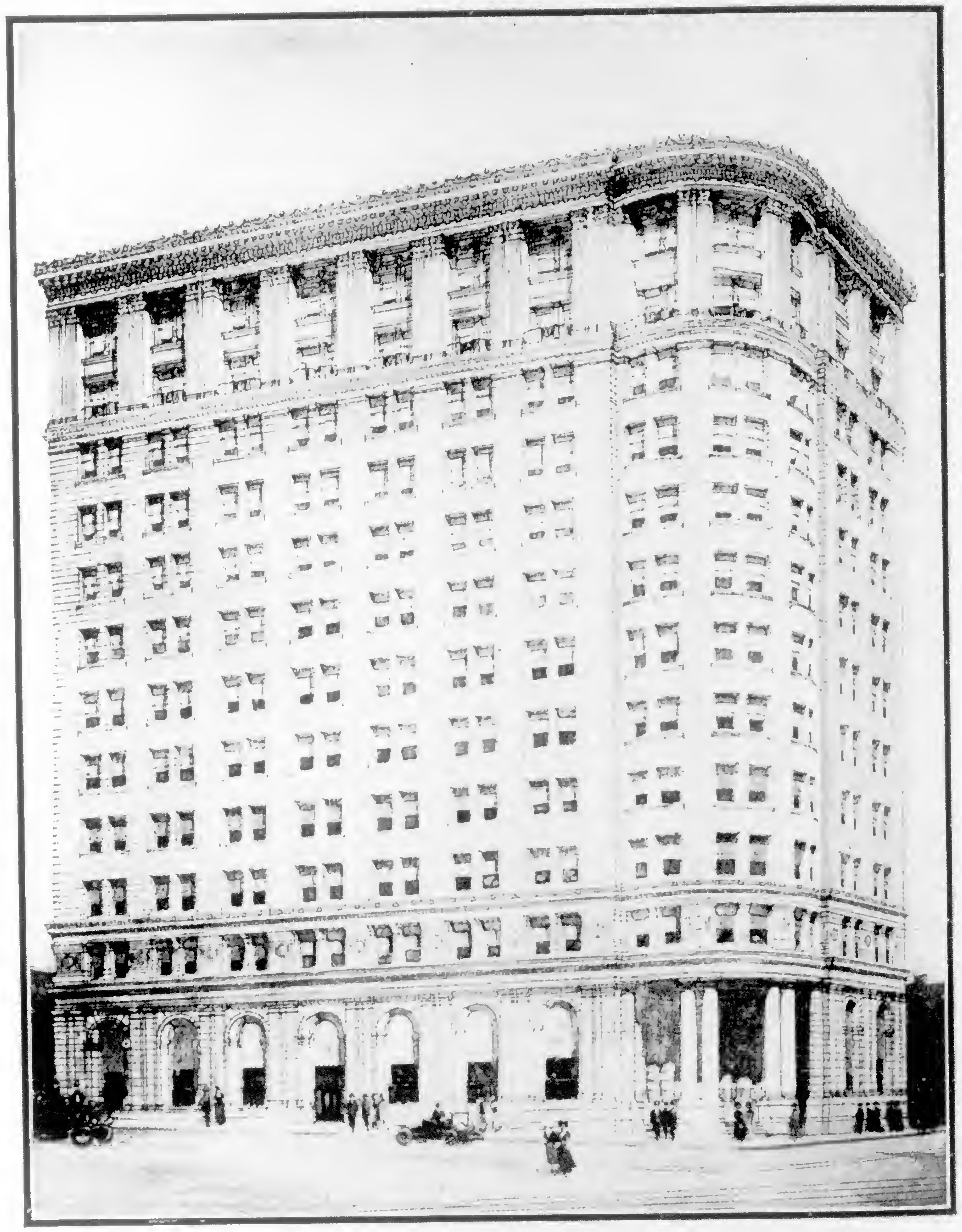


The Rehabilitated and Enlarged Mills Building, San Francisco
D. H. Burnham & Company, Architects. Smith & Watson Company, Contractors

The First National Bank Building, San Francisco

WITH the completion of the First National Bank building, on the site of the old Masonic temple at the junction of Post, Montgomery and Market streets, San Francisco will have one of the finest office buildings on the Pacific Coast. In the heart of the business and financial center of the city, the building towers to a height of thirteen stories—a monument to its builders and an example of what can be accomplished in speed construction by thorough organization, for it has taken less than ten months to practically complete a building that many contractors predicted could not be built in from twelve to fifteen months. The D. H. Burnham Company were the architects—a firm that is noted the world over for its superior system, turning out high-class work and overseeing it till completion. The First National Bank building will have cost, when finished, $1,350,000—a sum within the architect's estimate.

The building has been designed to withstand the forces of the elements, including fire and earthquake. The heavy steel frame is protected with rein-



First National Bank Building, San Francisco
D. H. Burnham & Company, Architects. Smith & Watson Company, Contractors

forced concrete floors and walls and the exterior is faced with Indiana sandstone and granite, the first floor and the massive columns over the entrance being of granite. All windows have metal frames and sashes and wire glass. The only wood in the building is to be found in the doors and door trim. The ground floor and basement will be occupied by the First National Bank, a portion of the second floor will have accommodations for the First Federal Trust Company, an auxiliary of the First National Bank, and the remainder of the building is divided into large, well lighted office suites for professional men.

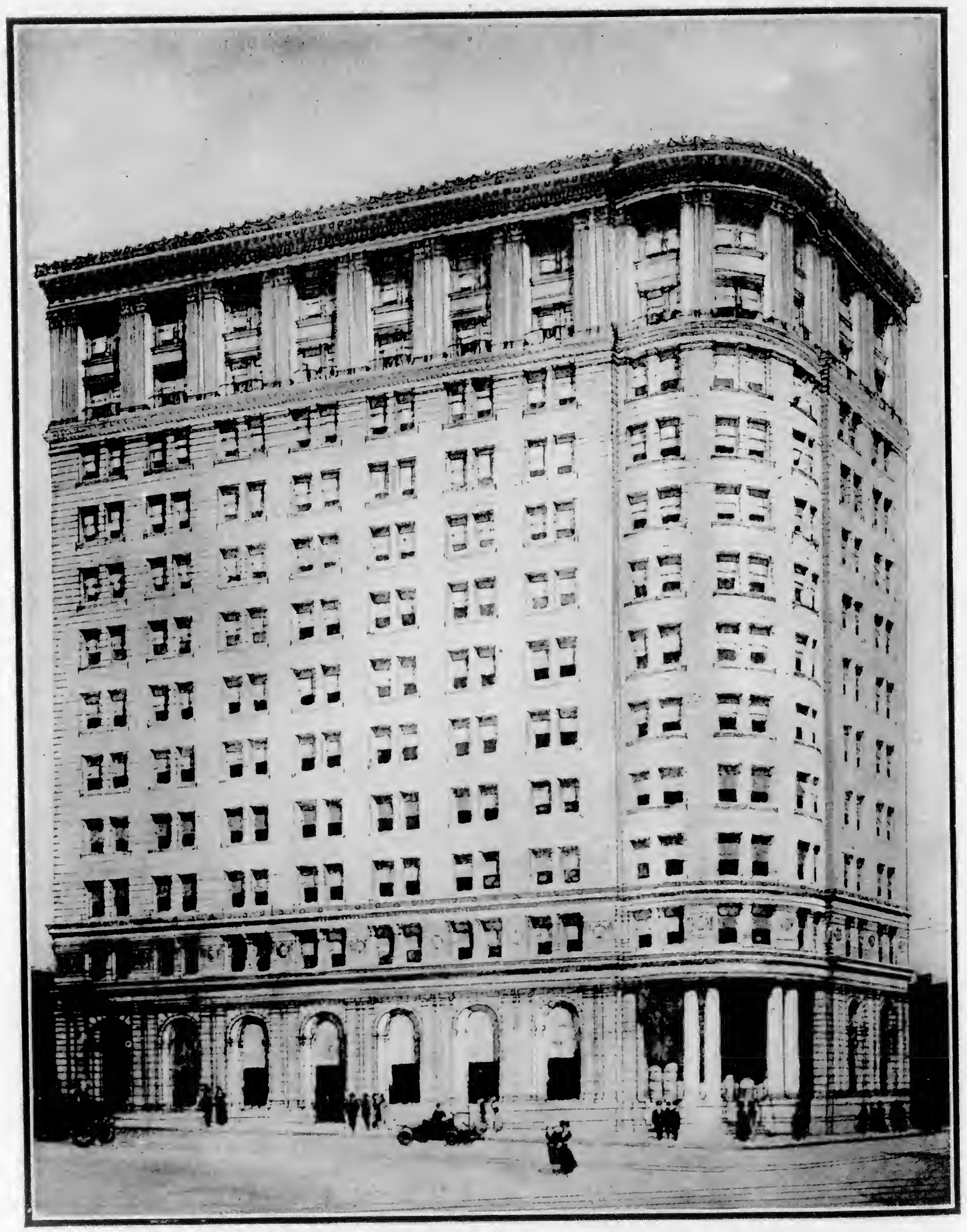
Work on the building was commenced January 3, 1908, and the principal contracts were awarded to the Smith & Watson Company, an Eastern firm, of high standing which located in San Francisco soon after the big fire. In less than two years they have completed, or have under way, contracts aggregating close to a million dollars. The firm of Smith & Watson succeeded the Smith & Eastman Company, contractors for prominent government and office buildings in all parts of the United States. Mr. Ezekiel Smith is the senior member of the firm and with him are associated Mr. William F. Watson, business manager, and Mr. Joseph Huntington, superintendent of construction. Mr. Smith is a retired contractor and resides on his stock farm at Marceline, Mo. The record made by this firm in putting up the First National Bank building is one that other contractors may well envy. At one time it had as many as 375 men at work on the building. This included carpenters, concreters, plasterers and helpers. Besides the First National, Smith & Watson were the contractors of the rehabilitated Mills building and annex, the Chronicle building, and the plastering work in the Union Square, Balboa and numerous smaller buildings.

A feature of the First National building is the elaborate decorative work in ornamental plaster and stucco. The design of the ceiling in the main banking room is Italian. The massive fluted columns of white plaster are in harmony with the ceiling, the design of which is taken from the Paris Opera and is tinted in gold. The design in the directors' room is an exquisite copy of the Palazo Ducale of Venice. All of the work on the first story was designed and executed under the direction of Architect Willis Polk of D. H. Burnham & Co.

* * *

The Portland High School Competition

PORTLAND, Ore., architects, as stated in the August Architect and Engineer, are having an experience in competitions which they will doubtless not soon forget and which is not likely to increase the enthusiasm of the profession, there or elsewhere, in future contests conducted by a municipality or public body. Last spring the Portland Board of Education called for competitive plans for a high school building, to cost not more than $250,000. Thirteen sets of drawings were subsequently submitted by as many leading architectural firms. Each design was numbered and the identity of the authors thus concealed. The Board invited a Seattle architect, E. H. Somerville, to examine the plans and select the ones possessing the greatest merit. In due course of time Mr. Somerville made his selections. The Board then awarded the prizes and ever since there has been a veritable teapot tempest because it turns out that the school trustees quite ignored the report of their expert. The architects who failed to win out carried their grievance into the circuit court and got a writ of mandamus compelling the school board to reveal



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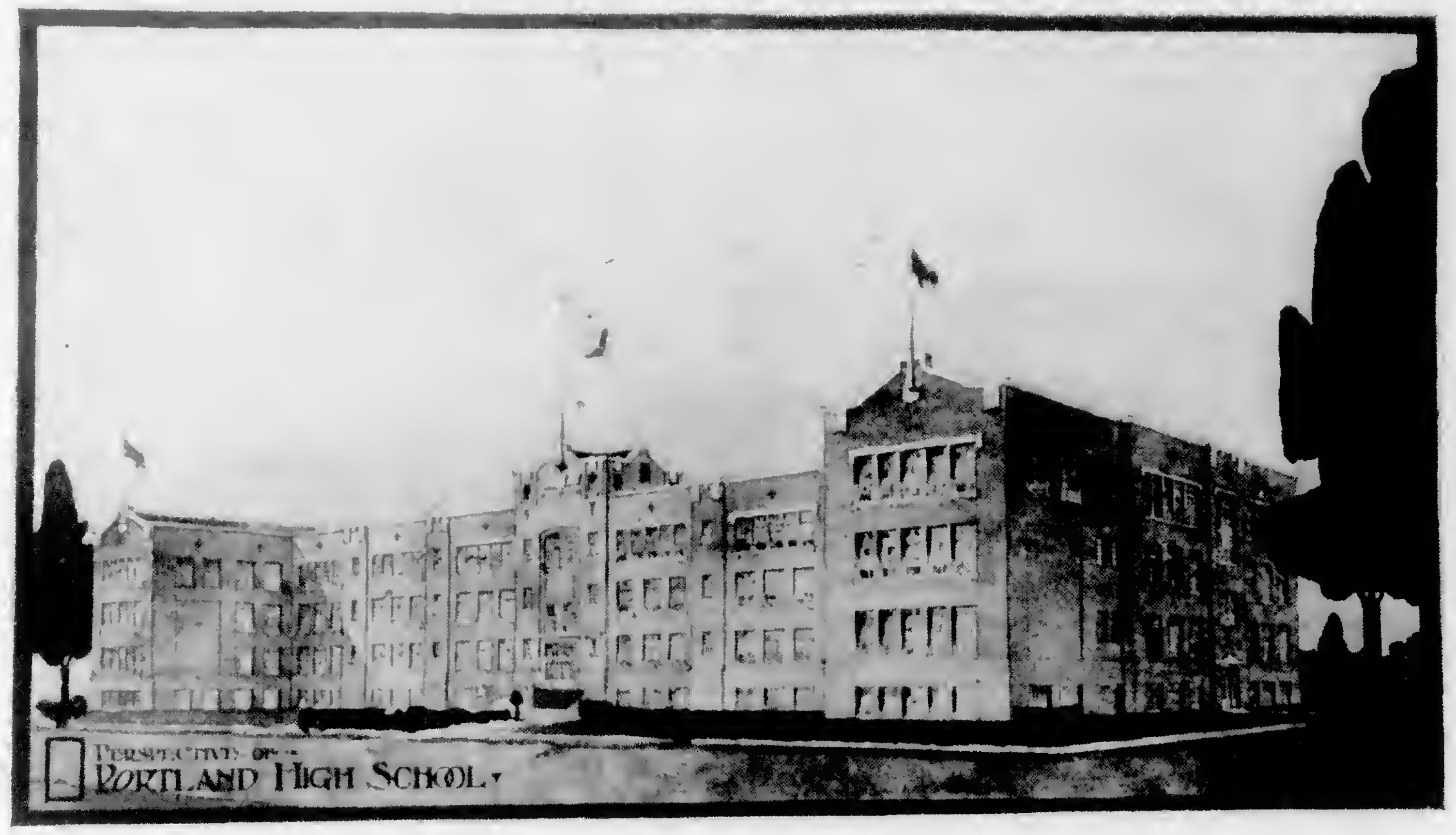

Perspective of Portland High School

Design of Portland High School Which Was Given First Mention by Jury of Award, But Was Sidetracked by the School Board

the contents of Somerville's report. To forestall the hearing the Board decided to permit the inspection and publication of the report.

In the report the first place was given to design No. 11, which was prepared by Kable & Kable; the first prize, $500, was given to design No. 10, prepared by Whitehouse & Honeyman; to design No. 6, by McNaughton, Raymond & Laurence, the $300 prize was awarded, while the third prize of $200 went to design No. 1, submitted by Kroner & Hen.

In making the awards, the school board selected as the design of the building, the plans of Whitehouse & Honeyman, which were given the $500 prize by Mr. Sommerville. To W. Jones, the official architect of the board, was given the $500 prize, while Kable & Kable were given the second prize of $300, and McNaughton, Raymond & Laurence received the third prize of $200. Architects Kable & Kable now threaten to bring suit to recover the full commission on the cost of the high school building, and it is probable that other suits will be brought by those architects who were awarded prizes in the Sommerville report, and who were ignored in the final award as announced by the school board.

Architects Kable & Kable contend that, under the competition program issued by the school board, which bound the board to accept the recommendation of a jury in awarding the first place and the prizes, that they are entitled to the usual architect's commission on the cost of the proposed building.

"Our plan, No. 11, in the competition, was given the first place by the jury," said Architect J. F. Kable, "and the school board, under its own printed rules governing the competition, should have selected our plans. Their failure to do so makes the school district liable to us for the usual commission paid for designing and superintending the construction of this class of buildings. On page 1 of the 'program for competition by architects for plans of the high school building' is the following paragraph: 'In arriving at a decision the board of education will accept the recommendation of a jury to be selected by the board of education.' If this means anything it means that the first place and the prizes would be awarded according to the report of the jury.

"We entered the contest believing that the printed program would be literally adhered to. In preparing the plans submitted by us, we followed the instructions in the program, and we believe the school board is legally bound by the provisions in this program."

The Story of Steel

A news cable a few days ago told of another Steel Trust with a capital of $750,000,000. It again proves very graphically the enormous possibilities for expansion in the manufacture of steel. The great Steel Trust of America, with its huge capital of nearly $1,000,000,000, holds the distinction of being the most classical example of the modern combine.

The world, therefore, sees the possibility of two huge steel corporations grappling with one another for the control of the steel industry of the world. The great American Steel Trust, with its far-reaching spheres of action, with its offices in every centre of the world, stands supreme as a modern example of business combination, and the story of its development makes interesting telling.—The Editor.

FIFTY years ago when the increasing use of iron created a demand for a material more durable than iron, and not so expensive as the laborious process of steel-making of that day, an Irish-American named William Kelly found himself in a desperate position financially.

He was an iron-maker, and by the old process needed charcoal, which was difficult to obtain. Unless he could save fuel he was on the verge of bankruptcy.

One day he was sitting in front of the "finery fire," when he suddenly sprang to his feet with a shout, and rushed to the furnace. At one edge he saw a white-hot spot in the yellow mass of molten metal. The iron at this spot was incandescent. It was almost gaseous. Yet there was no charcoal—nothing but the steady blast of air.

Why didn't the air chill the metal? Every iron-maker since Tubal Cain had believed that cold air would chill hot iron.

But Kelly was more than an iron-maker. He was a student of metallurgy, and he knew that carbon and oxygen had an affinity for each other. He knew what air was and what iron was and like a flash the idea leaped into his excited brain—there is no need of charcoal. Air alone is fuel.

Like almost all great inventors, he was derided, though his experiments proved successful. He had to give in, he had no capital behind him. It was not until Bessemer took the idea in hand that it became a commercial success.

Bessemer was one of England's greatest inventors, having one hundred and twenty patents to his credit. He was the son of an inventor—a Frenchman who had been driven to London by a social explosion in Paris.

His first invention, a method of stamping public documents was, so he considered, stolen from him by the British Government. He was very poor at the time, and this real or supposed injustice made an indelible mark upon his character. Henceforward he was bitterly aggressive in the protection of his rights.

Seven years after Kelly's success at Eddyville, Bessemer invented the Bessemer process, as the result of a conversation with Napoleon III., who wanted better material for his cannon. The new process was perfected by a third inventor, Robert Mushat, a Scotchman. He solved the problem of how to leave just sufficient carbon in the molten metal to harden it to the required quality of steel.

The method in the beginning of the new process was to endeavor to stop at exactly the right moment. Mushat's common-sense told him that it would expedite matters considerably if all the carbon were first burnt out of the iron, and the exact quantity needed put back.

Kelly made $500,000, and is little known; Bessemer received $10,000,000, world-wide fame, and a knighthood, while as for Mushat, he lost his patent through failing to pay the necessary fees, and got nothing, except a pension of $1500 a year from Bessemer.

The man that gave Carnegie his great lift was Captain William R. Jones, commonly known as "Bill Jones." Carnegie was an iron-maker, but Jones took the Kelly-Bessemer invention into the shop, and made it perform marvels. He was the man who earned most and received least among the big officials of the company. He refused a partnership, and asked merely for a big salary. Carnegie gave him the presidential salary of twenty-five thousand dollars a year.

It was Jones who originated the famous scrap heap policy; directly an improvement was made in a machine the old one was dragged out and the new device installed. On several occasions he startled the shareholders by asking permission to smash up $500,000 worth of machinery that was as good as new, but outgrown.

"Carnegie was the first steel-maker who introduced department store principles into the iron and steel business," says Casson. "His corporation was a large establishment run by a few highly skilled superintendents and by a crowd of young clerks, who were taught to do one thing fairly well. Partnerships were dangled before the eyes of these young clerks, until they were fevered with ambition. It was a system to make or break every young officer who served under General Carnegie. There was either a millionaire or a physical wreck in a few years.

"Every superintendent was pitted against each other. The heaven of a partnership and the hell of dismissal goaded the bosses and sub-bosses into a furious activity that put the Carnegie Company far in advance of all its competitors. No matter how much the sweltering furnace-men toiled, no matter how amazing were the achievement of today, tomorrow the same order came from the terrible General, 'More!'

"Every man had his work, and he held his place just as long as he could do the work better than anyone else. The moment a man showed signs of weakness or inefficiency he was immediately transferred, or pigeon-holed into some political office. There was a scrap-heap for men as well as for machinery."

And it can easily be imagined that this insane policy of rush caused the human machine to wear out more rapidly than it would by more equable working. But men were cheap and plentiful, and money was almighty. American business is callous, and in its ridiculous haste leaves no time for mere purposes of living.

Of all Carnegie's partners there was none so brilliant in business as Charles M. Schwab. He rose by steps, but the steps were gigantic. At the first stage he was driving in stakes for a dollar a day at the Edgar Thomson works. The second stage was six months later; he was then superintendent of the Edgar Thomson works—the foremost steel producing works in the world. At thirty years of age Superintendent of both the Edgar Thomson and Homestead plants, managing 8000 workmen; the only case in which Carnegie allowed one man to operate two plants. Fourth step, President of the Carnegie Steel Company, holding three per cent. stock, and drawing a salary equal to that of a United States President. Fifth step, President of the United States Steel Corporation, holding $28,000,000 worth (par value) of its stock, and drawing a salary of $100,000 a year. To quote Herbert Casson: "In 1901 he sat on the apex of the towering steel pyramid—the victor among 200,000 competitors—at thirty-nine years of age."

At the end of 1900, the Carnegie Company had $40,000,000 to divide; of this amount Carnegie's share was $25,000,000, the balance to the rest. It is said that from 1880 the company has never cleared less than a million a year. Others naturally wanted a share in this gold mine, and several offers were made for the Carnegie business. Carnegie was carrying on operations for the making and selling of steel, on such a scale as had never before been attempted. He was continually extending his operations in a way that would, if completed, have made him absolute master of the steel world.

To fight Rockefeller, he ordered seven eight-thousand-ton ore-carrying steamships. To fight the Pennsylvania Railroad, he set a corps of surveyors at work mapping out a railway from Pittsburg to the ocean. To fight the National Tube Company, he announced that five thousand acres of land had been bought at Conneaut, and that he had decided to build a twelve million dollar tube works.

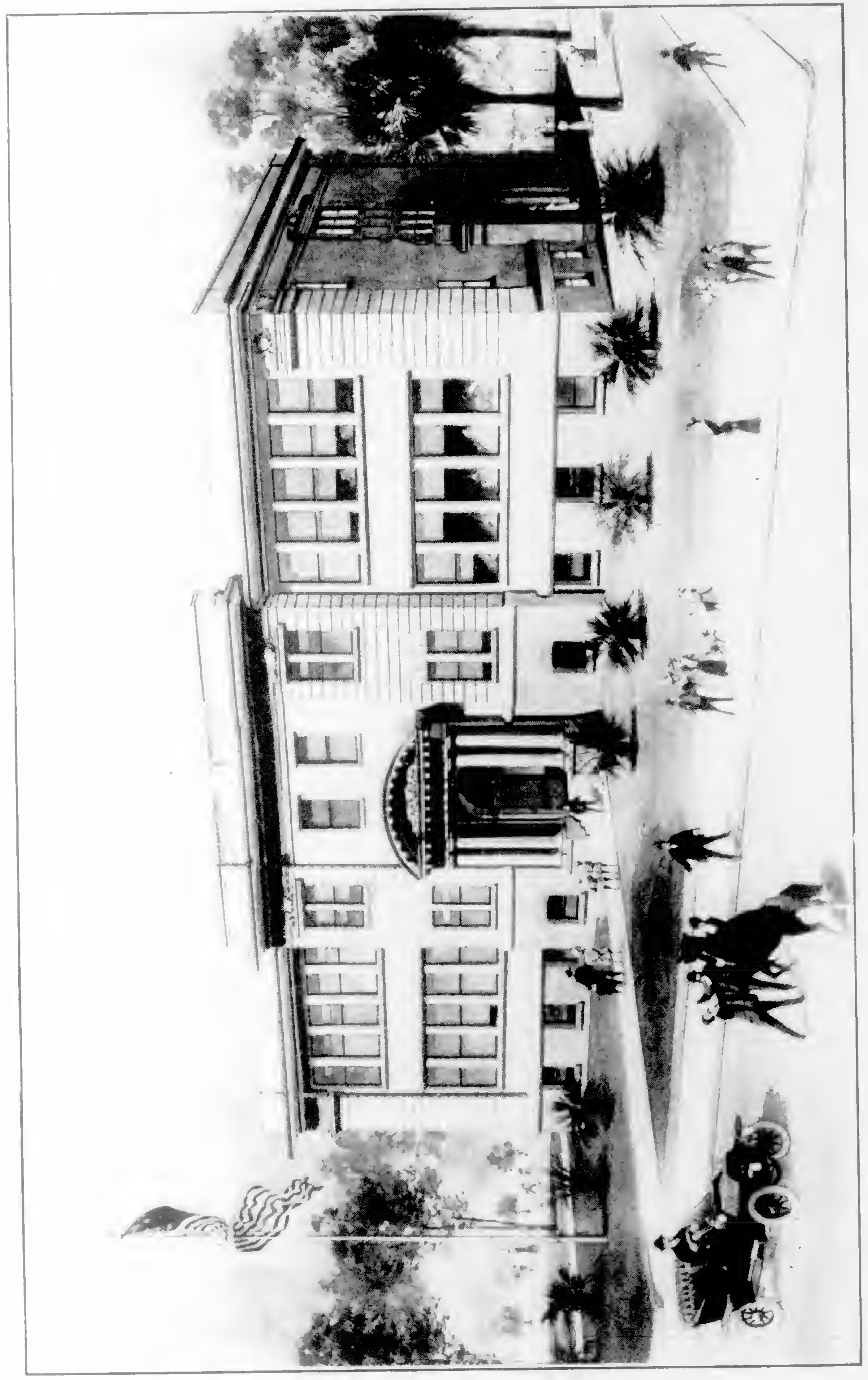
Manufacturers and financiers were afraid of him, and it was because of this scare that the scheme for buying up the company came into being. Morgan was appealed to and with his assistance the buying was engineered, the price paid amounting, roughly, to $487,415,000.

So the great Steel Trust came into being—the largest steel producer in the world, and one of the greatest and richest companies that have ever existed. It has made fortunes for dozens of people, and ruin for thousands.

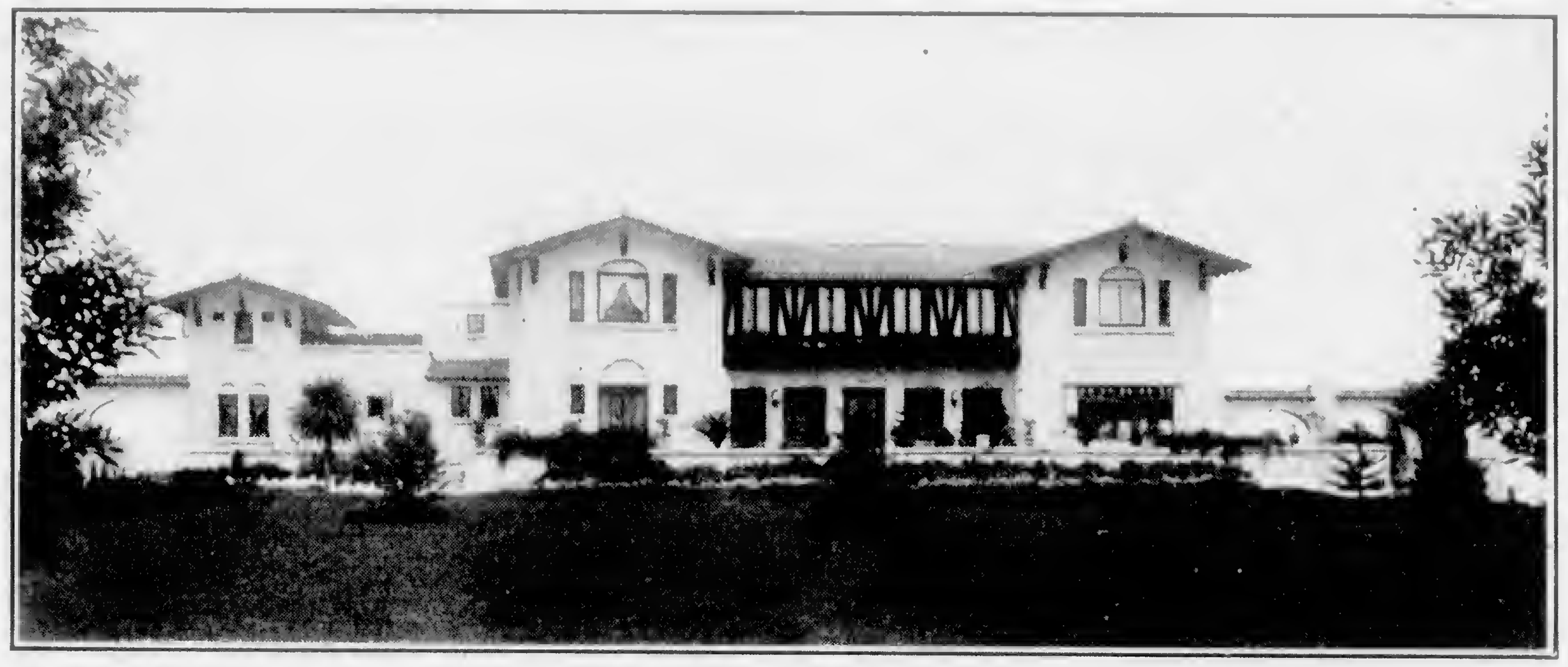
* * *

How to Paint Over Cement

IT IS not safe to paint over the surface of cement until it has stood exposed to the weather for about one year unless the surface has first been sized with acid water to kill the alkali, and even then there is some danger of bad results. Here is a somewhat tedious method for preparing and painting such a surface, but it has the sanction of some of the best painters, says the Master Painter. Slack one-half bushel of fresh stone line in a barrel and add in all twenty-five gallons of water; when slacked and cold, add six gallons of the best cider vinegar and five pounds of the best dry venetian red. Mix well and then strain through a fine wire strainer. Use it when about the consistency of thin cream. Give the cement surface a coat of this and after standing a day or so apply a coat of red lead and linseed oil paint. After this has dried you may paint the surface any color you wish. Some jobs require two coats of paint over the red lead paint. In this case make the second coat of paint serve as filler and paint both. This second coat may be made with plaster of paris and oil of the consistency of buttermilk. Then break up some white lead and oil to make a paint the same consistency as the plaster paint. Now take equal parts of each of the two mixtures and "box" them together, and thin to a working consistency with turpentine. This second coat should be applied as heavy as possible, or as heavy as you can spread it well. After this coat is dry apply your next and finishing coat of paint, which should be quite glossy, or about as you would for the last coat on woodwork outside. The object in giving it this plaster paint is to prevent the running and wrinkling of the paint where considerable paint is to be applied to the surface. And it must be made to dry quickly.



Design for School House at San Mateo, Cal.
Stone & Smith, Architects
B. I. Dunn, Contractor



Residence of Mrs. Lucy Walker, Los Angeles
Charles F. Whittlesey, Architect

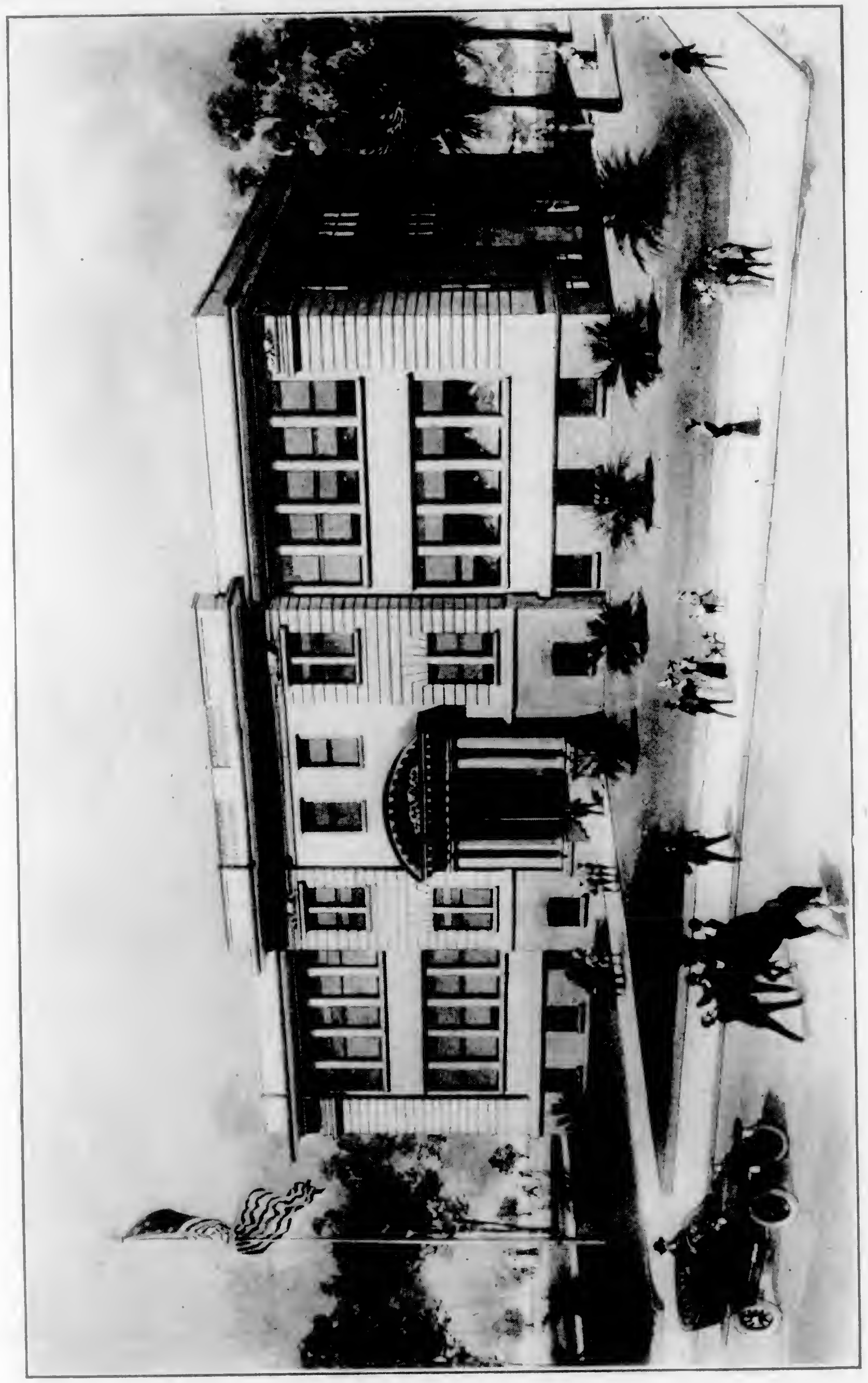
Houses Built of Concrete

THE announcement that Architect Charles F. Whittlesey of San Francisco and Los Angeles has prepared plans for a group of reinforced concrete houses to be built in Oakland, has given local interest to this type of construction which has heretofore been confined almost exclusively to office buildings, bridges, etc. In the East some very beautiful homes have been built of concrete. A few have been erected in the southern part of the State and there are one or two in the vicinity of San Mateo.

Since architects began to plan concrete houses, there has been noticeable development in the direction of pleasing designs and improved structural methods. Fortunately this has not been accompanied by an increase in cost. On the contrary it is claimed by some that it is possible to utilize concrete in satisfactory and durable construction which will show considerable saving over wood, brick or stone.

The three prevailing types in concrete houses are those constructed of hollow blocks, houses with solid walls and those with cement stucco surface. Block houses outnumber the others, and it is interesting to note the improvement recently made in the manufacture and application of the concrete block. The blocks first on the market were not accepted as a desirable substitute for brick or stone. They were usually of the rock-faced pattern, and were condemned by architects and builders of good taste. Many are still used, but they are gradually giving way to the plain surface block. The protest against the rock-faced block has been so general that manufacturers and builders are gradually discarding them. They have substituted a perfectly plain surface so far as any design is concerned, merely seeking to produce a pleasing texture and color. Some of the finest houses in the country, says Cement Age, have been built of these blocks, the facade being relieved by columns and cornices in moulded concrete.

A type of house which resembles the solid concrete structure is that having a cement stucco finish. This exterior finish has been successfully applied to every class of house. It has been used on houses of wood, brick and stone, and some of the most artistic and costly houses in the country have a stucco exterior. Cement stucco offers an interesting field for experiment. It is the conviction of some architects that studding and expanded metal could be covered inside and out with stucco at a cost far less than frame or brick construction and that this plan would result in thin but perfectly serviceable hollow walls, making a dry and durable house.



Design for School House at San Mateo, Cal.
Stone & Smith, Architects
B. J. Duffy, Contractor

Residence of Mrs. Lucy Walker, Los Angeles
Charles F. Whittlesey, Architect

Houses Built of Concrete

THE announcement that Architect Charles F. Whittlesey of San Francisco and Los Angeles has prepared plans for a group of reinforced concrete houses to be built in Oakland, has given local interest to this type of construction which has heretofore been confined almost exclusively to office buildings, bridges, etc. In the East some very beautiful homes have been built of concrete. A few have been erected in the southern part of the State and there are one or two in the vicinity of San Mateo.

Since architects began to plan concrete houses, there has been noticeable development in the direction of pleasing designs and improved structural methods. Fortunately this has not been accompanied by an increase in cost. On the contrary it is claimed by some that it is possible to utilize concrete in satisfactory and durable construction which will show considerable saving over wood, brick or stone.

The three prevailing types in concrete houses are those constructed of hollow blocks, houses with solid walls and those with cement stucco surface. Block houses outnumber the others, and it is interesting to note the improvement recently made in the manufacture and application of the concrete block. The blocks first on the market were not accepted as a desirable substitute for brick or stone. They were usually of the rock-faced pattern, and were condemned by architects and builders of good taste. Many are still used, but they are gradually giving way to the plain surface block. The protest against the rock-faced block has been so general that manufacturers and builders are gradually discarding them. They have substituted a perfectly plain surface so far as any design is concerned, merely seeking to produce a pleasing texture and color. Some of the finest houses in the country, says Cement Age, have been built of these blocks, the facade being relieved by columns and cornices in moulded concrete.

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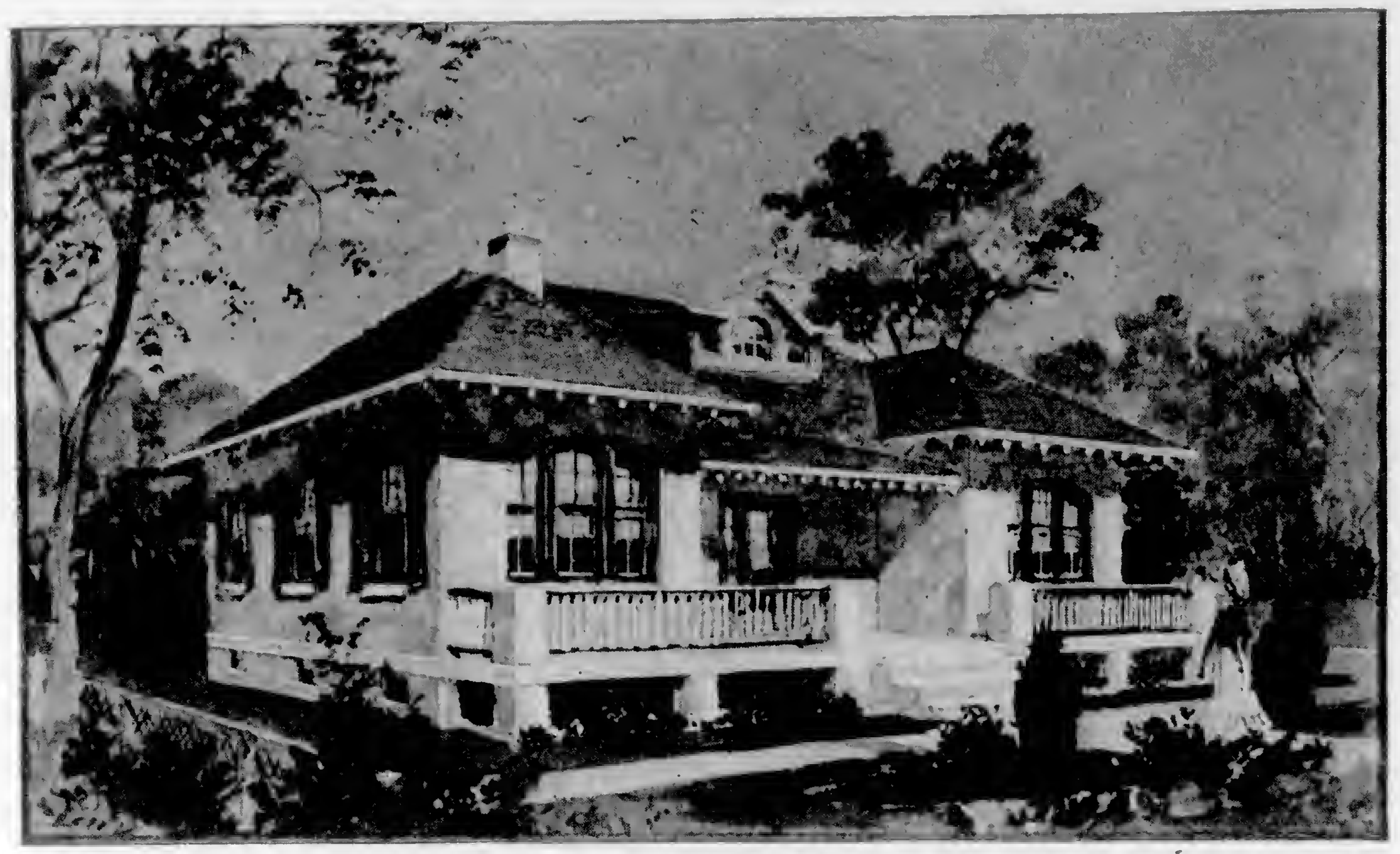
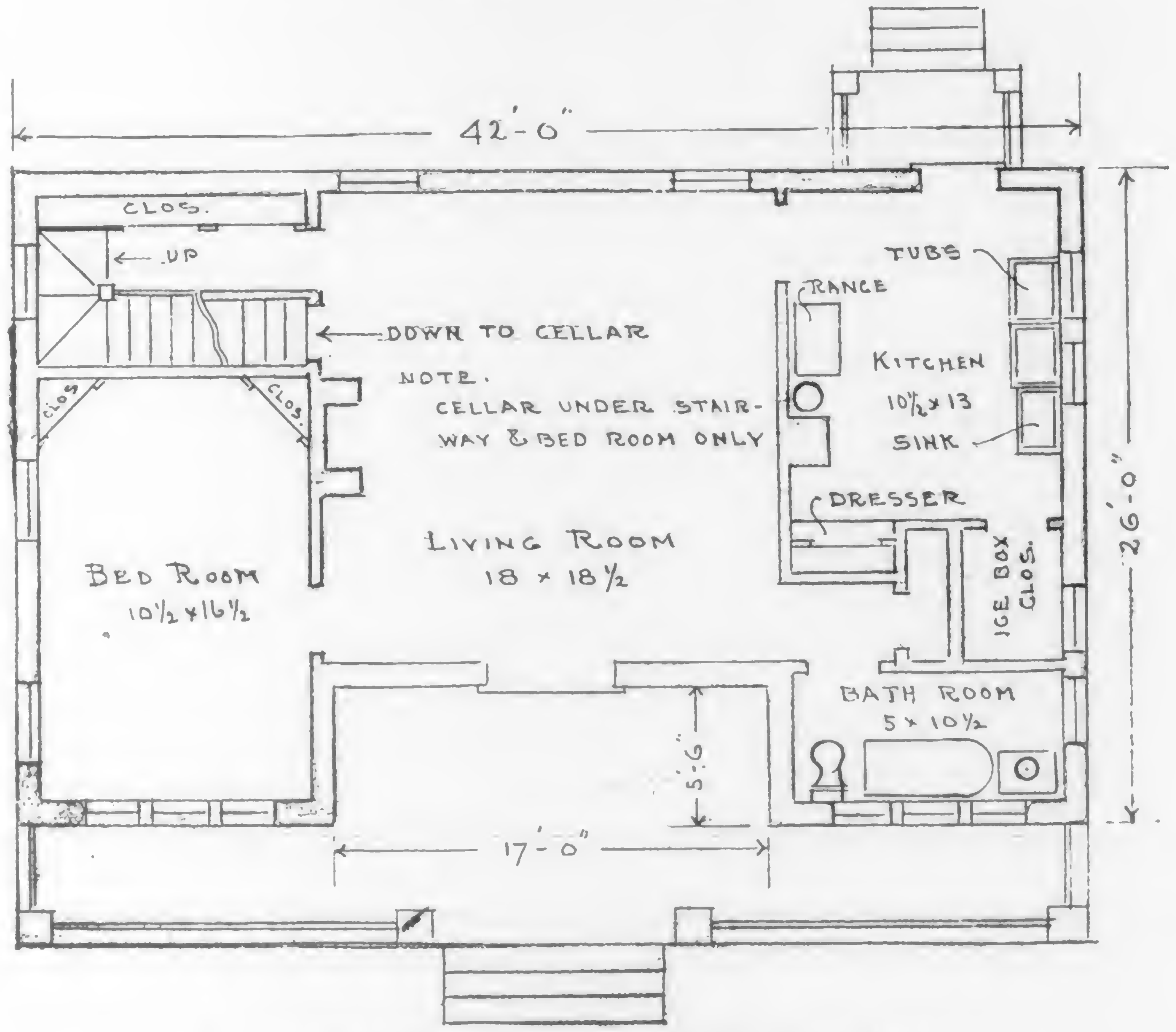


Design for a One and One-Half Story Concrete House
Geo. L. McElroy, Architect, New York



First Floor Plan of a One and One-Half Story Concrete House
Geo. L. McElroy, Architect, New York

Residence of W. S. Bartlett, Los Angeles
Chas. F. Whittlesey, Architect

Several attractive designs of concrete houses are shown herewith. They were made by Eastern architects for the competition recently conducted by the Association of American Portland Cement Manufacturers.

The accompanying drawing shows a one and a half story house, the ground plan of which is about 30 feet by 42 feet, including the porch.

There is to be a cellar under about one-third of the house which will be used for coal and storage. The ground floor is divided into a living room with open fire place, bed room with clothes closets, kitchen with set tubs, range, sink, dresser and ice box closet, sufficiently large bath room, linen closet and two other closets for coats, etc. The attic will be left unfinished, but is available for a servants' or extra bed room.

The footings, foundations and outside walls are to be of monolithic concrete construction, furred and plastered on the inside. The interior walls have been figured as stud partitions, but hollow concrete blocks may be substituted if desired. The floor beams and rafters are of wood and the roof is shingled. The floors, stairs, doors and trim are to be of yellow pine and varnished.

The cubic contents figured from the bottom of the footings and including porches, are 21,236 cubic feet.

Below is given an estimate of the cost:

Excavation	$ 43.00
Concrete	808.00
Carpentry	771.00
Plastering	186.00
Painting	127.00
Metal Work	40.00
Hardware	25.00
Total	$2,000.00

Unique Apartment Flats, San Francisco
Stone & Smith, Architects

The country residence of concrete shown herewith is 40 feet by 29 feet 6 inches in plan, two stories high, with cellar only under kitchen and serving pantry. Toilet required to be placed in cellar. Its cubic contents including porches is 45,031 cubic feet.

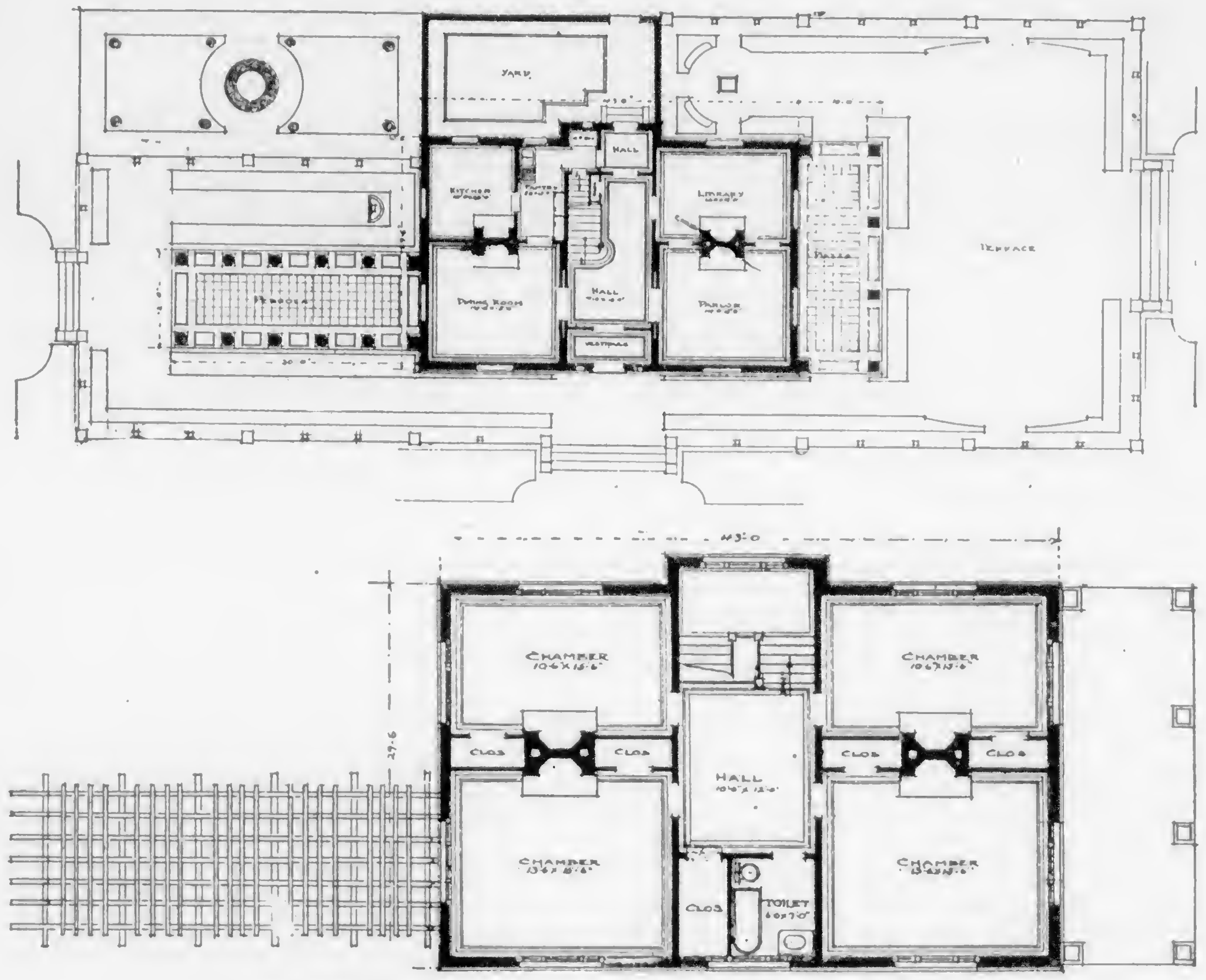
Foundation walls and all exterior walls to be of monocast concrete, finished on exterior with a rough cast finish of natural cement color, and all exterior partitions to be of cement blocks.

Chimneys and fire places to be of brick, lined with tile, and topped out with concrete blocks above roof. All columns of pergola and porches to be of cement blocks, finished same as exterior walls.

Cellar to be finished with cement, as well as floors of pergola and porches.

Plastering on interior walls to consist of two coats applied directly to cement blocks, and on inner side of all exterior walls to be three coat work applied on wooden lath over furring. Last coat to be a hard white finish or sand float.

Framing of floors and roof, furring strips, etc., to be of spruce or hemlock, window frames pine, rough floors of yellow pine, finished floors rift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DINING ROOM
HALL
PARLOR
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29'-6"
CHAMBER 10'6"X15'6"
CHAMBER
CLOS
CLOS
HALL 10'6"X12'6"
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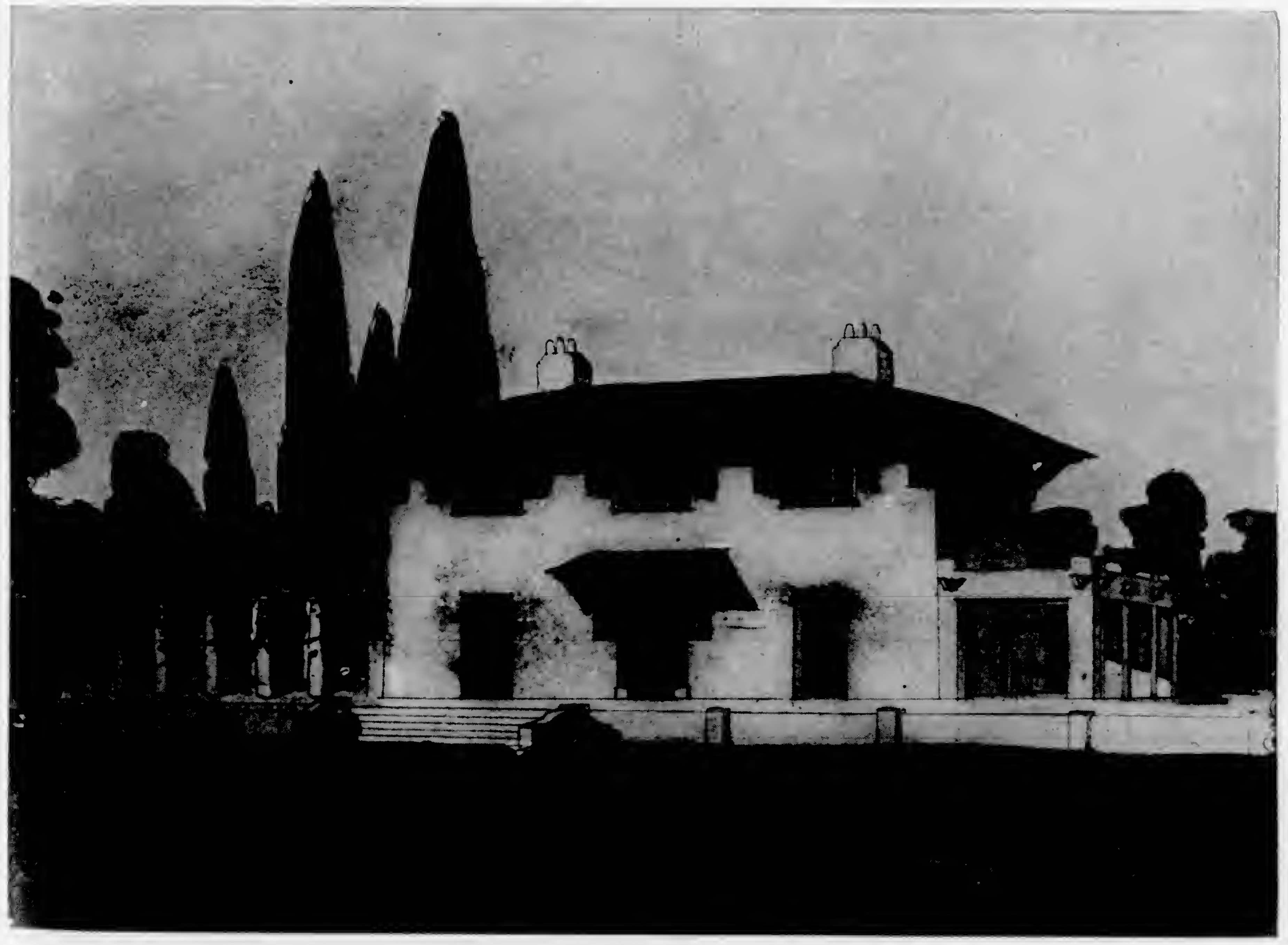
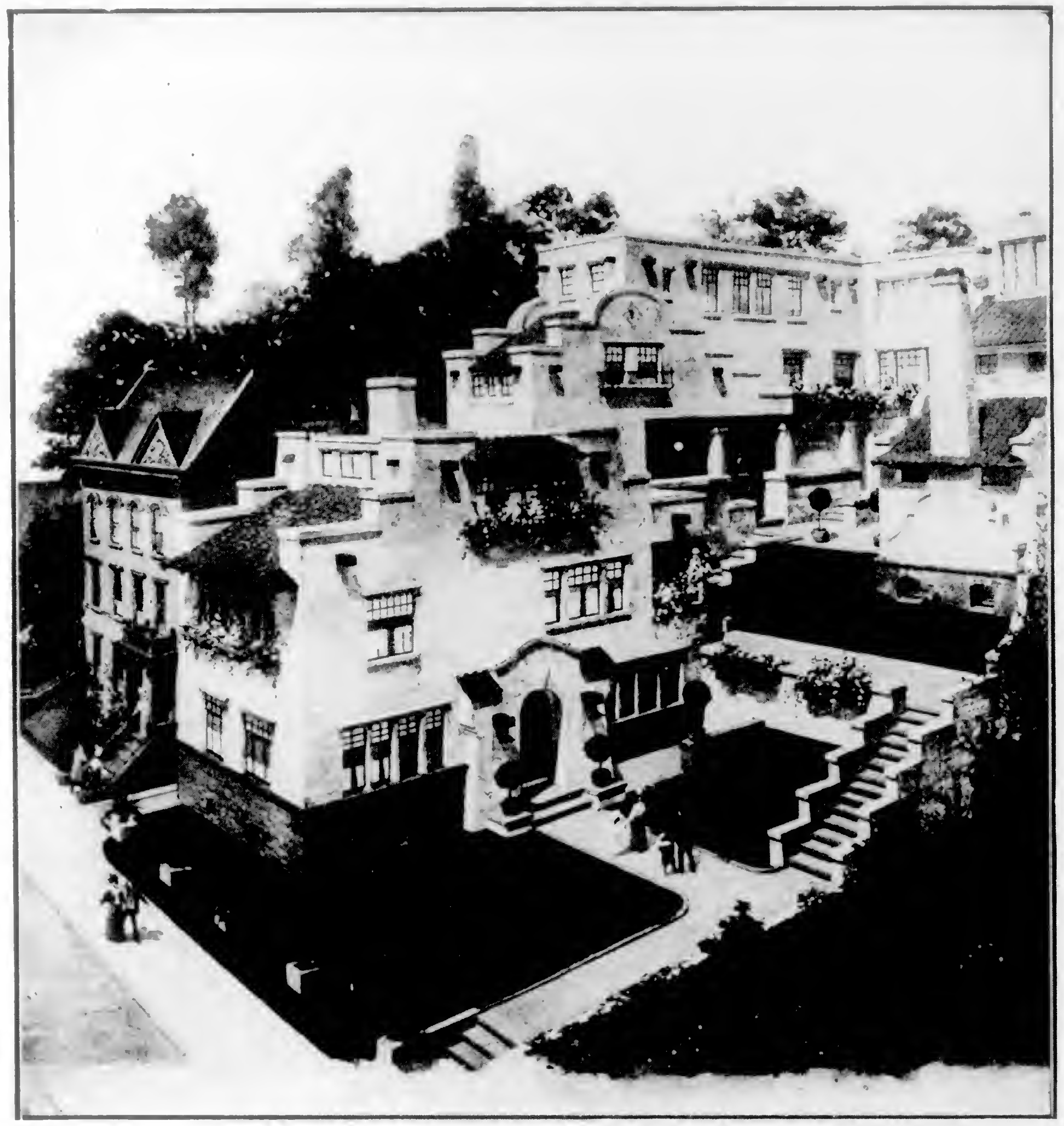
TOILET 6'0"X7'0"

First and Second Floor Plans Country Residence of Concrete
J. F. Rowley, Architect, New York



Design for Country Residence of Concrete
F. Rowley Architect, New York



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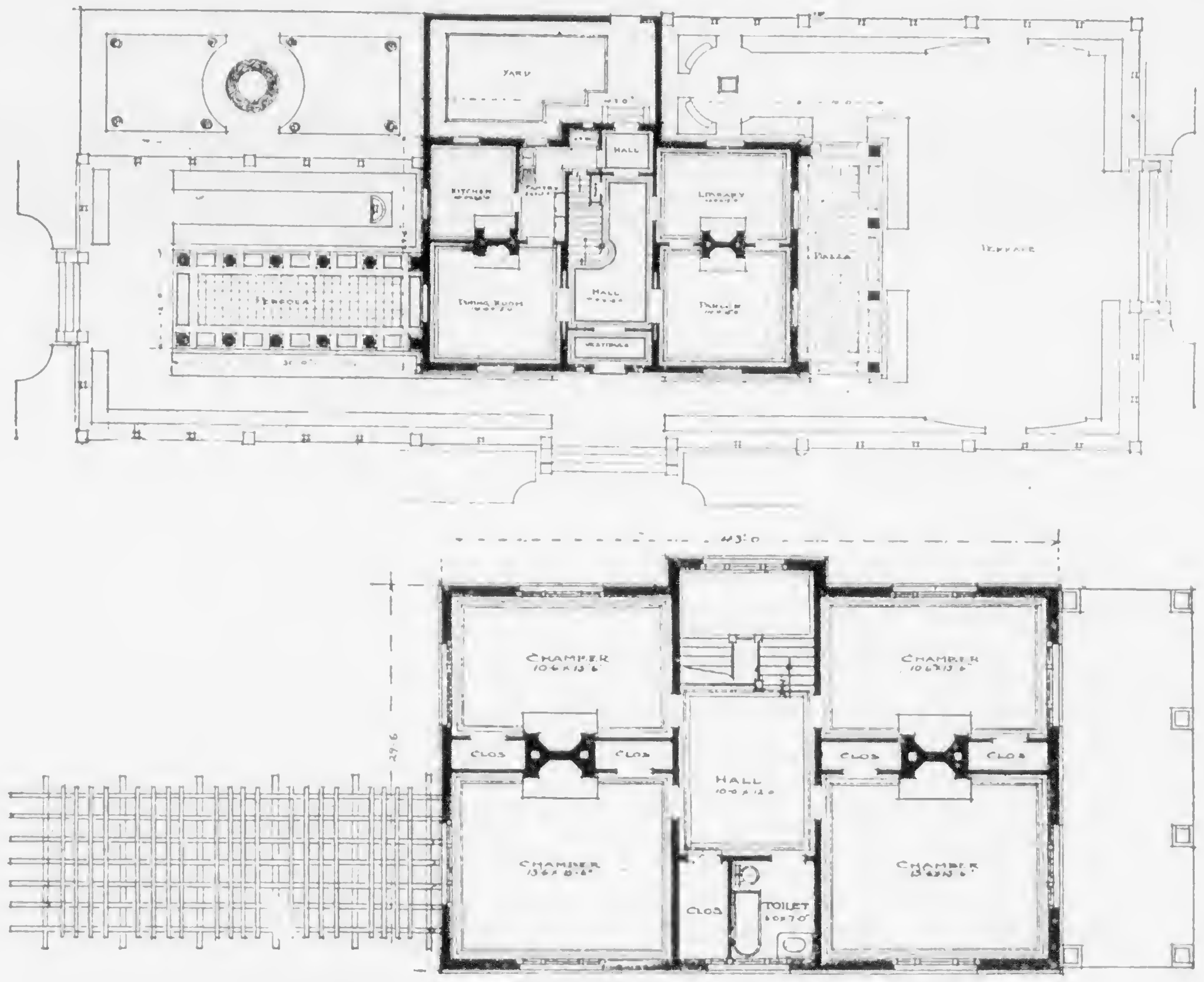
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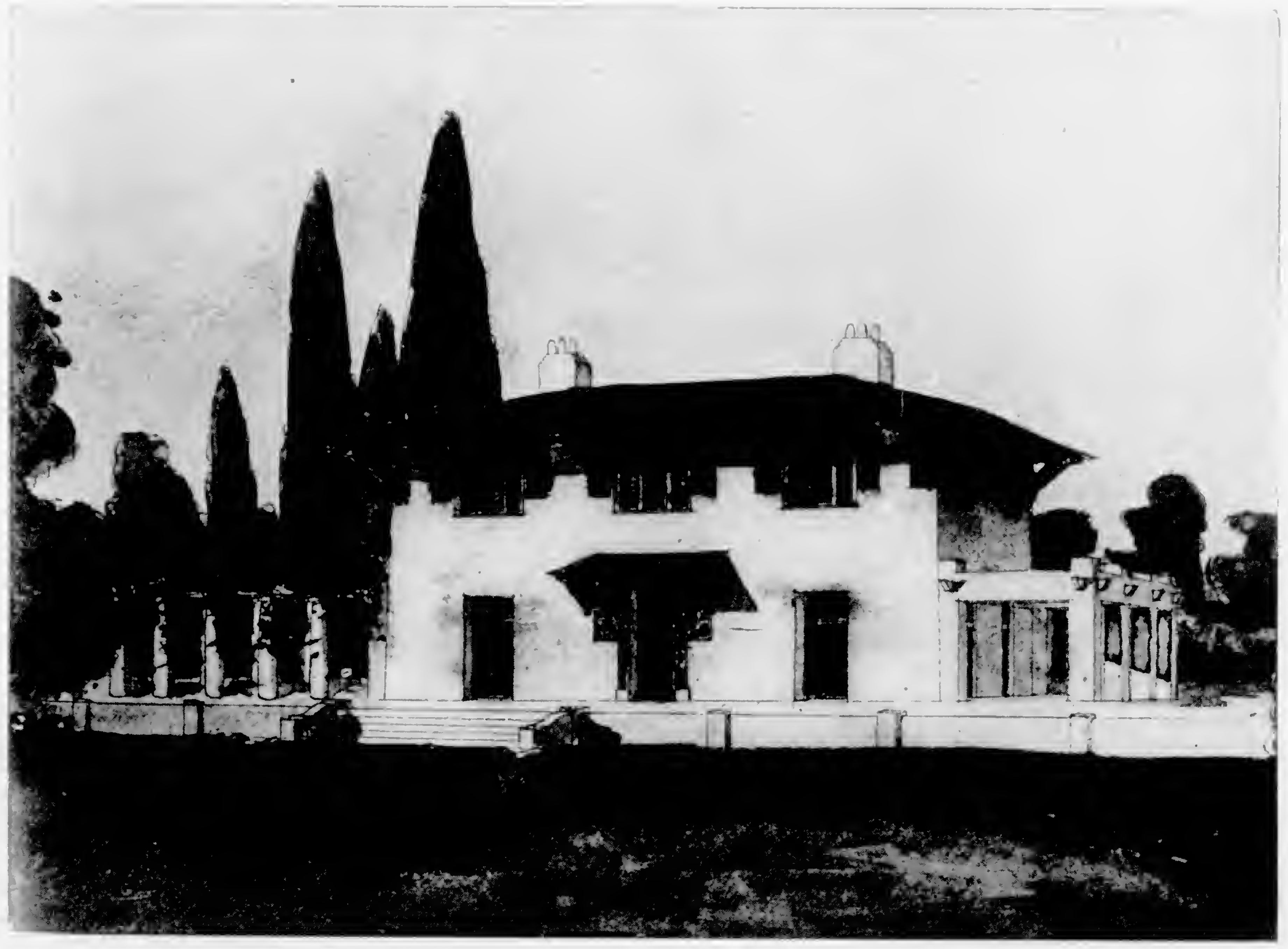
43'-0"
CHAMBER 10-6 x 13-6
CHAMBER 10-6 x 13-6
CLOS
CLOS
CLOS
CLOS
HALL 10-0 x 12-0
29'-6
CHAMBER
CHAMBER
CLOS
TOILET 6-0 x 7-0

First and Second Floor Plans Country Residence of Concrete
J. F. Rowley, Architect, New York



Design for Country Residence of Concrete
F. Rowley Architect, New York

sawed North Carolina pine, stained and varnished. Principal rooms and hall to be trimmed in oak or chestnut, stained and finished with varnish or waxing. All other parts to be trimmed in cypress natural finish.

Brackets on exterior to be of cypress stained to match Flemish oak, as well as entrance doors. Other exterior woodwork painted three coats. All glass to be best quality sheet glass, leaded where so shown; pitch roof to be covered with Spanish tile over sheathing and paper, and all tin roofs and flashings to be of best grade tin, properly painted; all hardware to be of substantial pattern, ornamented for important rooms; bath rooms to have Keene's cement wainscotings, polished and varnished and ceramic or tile floors.

Below is given an estimate of the cost:

Excavating, concrete, cement and stucco work, and further masonry	$2,200.00
Plastering	625.00
Rough and finished carpenter work and labor	1,150.00
Hardware	45.00
Tile roof, tinning, etc.	190.00
Painting	265.00
Total	$4,475.00

* * *

An Epitome of the Situation

"EARLY in the season we exerted every effort to get orders, now we are exerting the same amount of effort filling them," said the sales agent of a prominent cement company.

"Orders come much easier than they formerly did," is the way another prominent sales manager put it.

"We are having less difficulty than a month ago securing orders, and prices are ruling firmer," said another.

It would seem as if cement had reached its lowest level and that from now on prices will not only rule firmer, but will show an actual advance. Certain sections of the country have used just as much cement as ever before, and while other sections did not, there has not been such a falling off as one would imagine.

Some of the big companies are already making preparations to run their plants full time, but they are going to have the orders in sight before they do.

With the return of confidence, building operations all over the country are resuming a healthier tone.

The financial condition of the banks, according to eastern reports, is very satisfactory.

The two great political parties have chosen their standard bearers.

Everywhere we hear of factories of all kinds starting up and others taking on more help.

Lumber is advancing slowly but surely.

In fact, there is every indication that the tide has turned.

Buyers are more anxious to make contracts, and cement companies less anxious than a month ago. This is the surest indication of the change of feeling. Cement manufacturers are no longer trying to force the market, although they are using every legitimate argument to induce people to buy now.

Reports show that stocks held in warehouses are diminishing and that dealers are buying more liberally than for some time.

Many of the great projects held in check by the stringency are again being taken up.

Summarizing up the situation it can be said that the natural growth work has kept the market from becoming stagnant and that the return of confidence shows conditions improved everywhere.

The Steel Situation in San Francisco

By H. W. KERRIGAN,
Commissioner Structural Steel and Ornamental Iron Branch, California Metal Trades Association.

IN THE face of the serious economic conditions confronting San Francisco at the present time, and the campaign that has been inaugurated by the structural steel and ornamental iron plants of the California Metal Trades Association to meet the situation and encourage in every way possible home industry, or home protection, it would be well to show the conditions as they are, cause of them, remedy, if necessary, and the general attitude of those that should concern themselves towards the betterment of them; at the same time, to comment on influences that are indirectly pertinent to the general subject. But most of all, to dwell on the really selfish, individual, lukewarm feeling of those who should be vitally interested in the development of their city and who do not, or will not, understand the seriousness of it sufficiently to try and improve it; and at the same time, not forgetting our own manufacturers who are suffering as a result of these existing conditions and who can also aid in bettering them for themselves, with malice to none and fairness to all.

It is hardly necessary to explain that, first of all, our dissolution came from the fire and earthquake, the disintegration of the corporation and individual interests as a result, and a weakness of our position taken advantage of by manufacturers' agents who had nothing to lose coming in here, to swell their coffers from our scanty funds, people whom we really can't blame, as they were a necessity at the time, but for our own self-preservation we should endeavor to do without them by creating a demand for our own products. That we have improved in machinery and shop conditions, in efficiency, and in new foundries, and that the city has improved also in its rebuilding, is a good reason why we should do without the Eastern business, if possible. It will be so if we make it so. But, when large corporations from the East, like a certain steel trust from whom we are forced in many ways to buy our plain steel, come right in over our heads, giving options under the lowest local bid, no matter what it may be, and accepted by those who should understand the struggle for the home people,—it is no wonder that we should protect ourselves against such unfair dealing.

Are such means fair? Should the city be drained by the many tentacles of this steel trust octopus, when we can buy Belgian steel or steel from the independent companies in America? As an example of the methods used by the jobbers here in one particular line, connected with our own Association: A jobber had bought five thousand flanges from an Eastern concern, paying two cents more a flange than our manufacturer would have charged, besides the cost of shipment from the East. Just the other day, awaiting another shipment, this same jobber, short of an order for flanges, sent to this local manufacturer for one flange, using him in the emergency. And then do you wonder that our people are crying hard times when they make the times hard themselves? This is an absolute truth—the quality of the flanges made here can be proven as good in quality and finish as the Eastern product.

If the jobbers could only be taught to leave their orders at home instead of buying from the Eastern manufacturers, and practice reciprocity at home, they would help develop our own industries—but just there lies the fault; the people at home insist on sending East, and wait at least four or five months for an order when they could save time and price of shipment by patronizing their own people.

Those who are in the iron and steel industries in San Francisco know that as far as steel is concerned, we cannot compete with the East on prices for the reason that the freight and shop conditions here are against us. The architects and contractors know these things, and instead of explaining to the property owner that it makes really small difference, financially, after all, they let him buy indiscriminately, ignoring the fact that by all the laws of reciprocal economics, he makes the difference back again.

Doesn't the property owner see the wisdom himself? Let him study it out economically. That is all we ask. Let those that can do so, help; it is money in their pockets eventually, as well as helping the city that helps them.

We can't smelt iron ore here, we admit, properly to roll the steel at the present time, although they are doing it to a small extent up North, but hardly enough for their own demand. We haven't the carbonated or bituminous coal qualities to make coke to reduce the ore. The first result in that direction in this state was made the other day in Northern California, but it is merely a find with no quantity to supply the demand. It was made through electricity and oil.

But for just those reasons and the little material difference it makes, and because one must pay a trifle more for the steel here to build with, every one building or buying should be just that much more willing to help. If we could reduce our ore here (Madera county is full of it) we would find that there is twenty-five per cent more magnetic force in the quality than in that of the Eastern ore.

Some have said: "What's the use? You have to buy your steel material East anyway; you only get a certain percentage of profit." That isn't it; even if we don't make much on the actual buying of the steel after it is here, it is because there is so much labor attached to the finishing and fabricating of the steel that counts, for labor is 87 per cent of all building; and what creates capital but labor? What circulates money but labor?

But there is something to be said about labor and its influence on the stringency. The situation is a strange one; and the laboring man is such a prominent factor in this city. How inconsistent he is, in view of the working conditions. As the architects and contractors are to blame for their neglect to home patronage, so are the workingmen. We realize that the mechanic has his stock in trade as well as the manufacturer, but is not dragging him down financially to carry it, like the mill man who must pay interest with capital invested to maintain his machinery, equipment, etc. The riggers who erect structural steel and are union men, will work on non-union made steel of the East. But if the local plants should send out steel from non-union shops, how quickly they would object to putting it up! And yet the workmen in this city have three hundred days to work out of the year, compared with one hundred and twenty days of their Eastern brother in the same line. This result of climatic conditions makes the cost of producing, with the labor, 17 per cent in favor of this state, if other things were equal.

Closely studying the existing conditions, there is another and more serious point that is undermining the local industries in every line, and that is the cutting of prices to the extreme of accepting a contract or contracts below cost to keep the work here. This naturally has caused much competition among our own people so that there is dissension everywhere. But it is only the inevitable result caused by the depression, and the only thing that can be done, although with little or no profit, is to come to an agreement on the regulation of prices in the various lines; or, let the small plants keep within their capacity and not accept jobs they cannot handle and allow the larger firms in similar lines to take the larger contracts. That the different builders and manufacturers are aware of this suicidal procedure is a fact that is agitating the entire city and there is only one logical way out of it. Instead of the jobbers and the various factories buying out of the city, except where it is entirely necessary, let them see if they can's buy of their neighbor, and he'll do the same by them. Reciprocity and home protection are the only way out of it. Let them investigate and see if they cannot buy the artaicle they are looking for in this city.

What has brought about these conditions? It is easily enough told. The big plants and contractors were affected by the big jobs going East and still are, and are forced to take the next best,—the smaller jobs that they would not accept under normal conditions. As a result the smaller shops, deprived of work that is properly theirs, are forced under this stress to survive the best way possible and are barely existing. It can't last much longer. Even to make a cent when they do accept a job, the small shops in various lines must watch the job until it is finished to get the profit on the labor part alone.

And then, in the face of all this, is the city's proverbial apathy. It should be everybody's fight and the city fathers' especially; but they are not making it such. How inactive they are, and yet how active in other directions. Corporations are fighting corporations; individuals other individuals. It is one grand fight of different interests, like children, instead of a co-operative whole for the successful future of themselves and the city.

And in this vortex of strife the Eastern manufacturers come in and grab up the choice bits while we must be satisfied with the crumbs. Individual and corporation selfishness is depriving us of our spirit to build up a city, stunting its growth by giving the very money we could circulate among our neighbors, to outside institutions. If the city would only make it its fight, the people themselves would fall in line, as the city must sell its bonds to its taxpayers who must have the money to buy them with—what better way can that be done than by giving them the contracts for, say, auxiliary water system, sewer system, school-houses, hospitals, hall of justice, county jail and garbage plant, by which they can pay for them.

Instead of an association like ours carrying on a campaign for home industry protection, let the demands for such come from the city itself; and then we will get results. If we must have differentials on freight rates from the East to help develop our industries, and a difference made in labor conditions, let the city take it up, the latter movement, through appealing to the labor unions, the former through appealing to the Interstate Commerce Commission.

In spite of the existing conditions, how few seem to realize them, and how little those that do have aided in the campaign for home recognition. The attitude at the present time is a listless one, and the little that has been done shows how much more must be done before we are on a fair way to accomplish our ends. Every one is waiting for the other fellow to take the initiative in our campaign. The very people that should interest themselves do not: the architects, the contractors and the property owners, as we have mentioned before, are the ones who can keep work here, and how little they seem to have accomplished thus far; however, in some cases, they have helped and have put themselves out to do so—for credit must be given where it is due.

Some have said, for the shops to make a stand and improve conditions, that we in the structural steel and iron industries, like the rest of the city, are in the grasp of the labor unions and that we should get together and do something. Instead of instructing us, they should organize themselves to bring about a closer affiliation for home protection for the home people. They are satisfied because very little architectural and contracting work has gone out of the city, but when any does go, or has gone, what a row there is, as in the case of the Merchants Exchange building. They haven't forgotten that, and still just such cases go out of the city in structural steel and ornamental iron every once in a while. That is what we are objecting to. It isn't because we can't do the work here: but because they, the architects and contractors are judging from our past demoralized conditions immediately after the fire. Then they said: "We may be able to keep work here, but our clients want the best at the most reasonable price, so what can we do?" Then we appeal to the property owner and he says: "I leave everything to my contractor," so the subject is shuttle-cocked from one to the other in so many cases.

Doesn't the man building realize that he must have tenants and that he could get more and create a better feeling at home, even at the disparity in cost, if he let the work here? Wouldn't it pay him in the long run in the direct circulation and the re-circulation of the money and aid in maintaining a better clearing-house report, benefiting himself and everybody in the city.

The newspapers are treating the subject in an earnest manner and are appealing along economic lines and many current journals are devoting much space to the subject of home industry. Still, it seems so inadequate in the face of such a giant task without co-operation from those directly involved. It is so discouraging when one suggests a closer co-operation to some who came back to you with: "The people of this city never were together, and never will be!" That is the contention one meets during a campaign of this kind. What are the various bodies doing if it isn't for a closer feeling of harmony among themselves? Are they not together for some common cause? And what could be better than the cause of home industry? Where is there a closer feeling of harmony and mutual understanding than in Los Angeles and the northwest cities, with one end: home patronage! And then we say we can't get together! Will we? Can we, if we think and talk that way, with so many different and divergent ideas confusing the object of our campaign.

The commercial bodies are interested to a certain degree, but it seems such a small item to them after all—only a side issue, while it should mean the very existence and life to them—as it should to the city and the state. It is the one all-important issue that will help us financially and socially.

We must improve conditions—what is to prevent us, with the great natural resources of our state? Should we allow our manufacturing interests to decay, with the vast amount of flood waters that is at our command to generate power, to go to waste? when only seven per cent is used at the present time, and part of that evaporation; and with the great wine industry that may be lost to us if some effort is not made, by co-operation in the interests of our state.

What more sane way can there be of allying and equalizing the various interests more logically along the lines of practical economics and wisdom in the regulation of the same, than by patronizing home industry?

* * *

A Startling Discovery (?)

CLAYWORKER, the organ of the brick people, is inclined to throw cold water on the recent building material tests and subsequent reports made by the Government Geological Survey, even though the report found most favorably for brick and terra cotta. Says our contemporary:

"Architects, engineers and building experts are much amused at a grave pronunciamento that has just been issued by the Geological Survey, that, incidentally, is spending about $300,000 of the people's money yearly making tests of building materials, fuels, etc. If all of these tests developed nothing newer than this last one, that money had better be expended in experimenting how to keep rats out of grain bins, for instance. According to press reports, those profoundly learned and able experimenters, 'impelled by the present tendency in New York and elsewhere toward building enormously high structures,' have had their attention directed to the corresponding danger from fire. They have just completed a series of elaborate tests of building materials, with a view of ascertaining definitely the relative fire resistance in each. While these tests are not conclusive, they show a number of facts: 'That brick stands the tests better than any other material; that natural building stone behaved worst of all, and that the almost complete destruction of these stones precludes them from any comparison. * * *.'

"The world is certainly grateful to these scientists for this astounding information. It at least puts the official stamp of approval upon what was commonly known and has been perfectly understood for something like 4000 years. It shows the dignified slowness, but absolute certitude of governmental methods.

These high authorities might also officially inform us that lime is made by burning limestone, that granite pops in a fire like so many toy pistols, spalls and ultimately goes to pieces, and that concrete, itself an artificial stone, acts just like the stone from which it is made and is a scant protection against fire; and that steel or other exposed metals bend and twist and contort themselves most shamefully in fire. Then they might also add the official information in corroboration of what is so well known that the ideal building is one whose steel frame is completely protected with fireproofing clay tile and whose partitions and floors are of brick and similar fireproofing tile, and whose outer walls are of well burned brick, with equally well burned terra cotta decorations and trimmings. They might then tell us that the world is round. In fact, for $300,000 a year we expect to be told much that is new, but of ancient information, facts of many vintages ago, why, $300,000 should procure us bushels thereof."

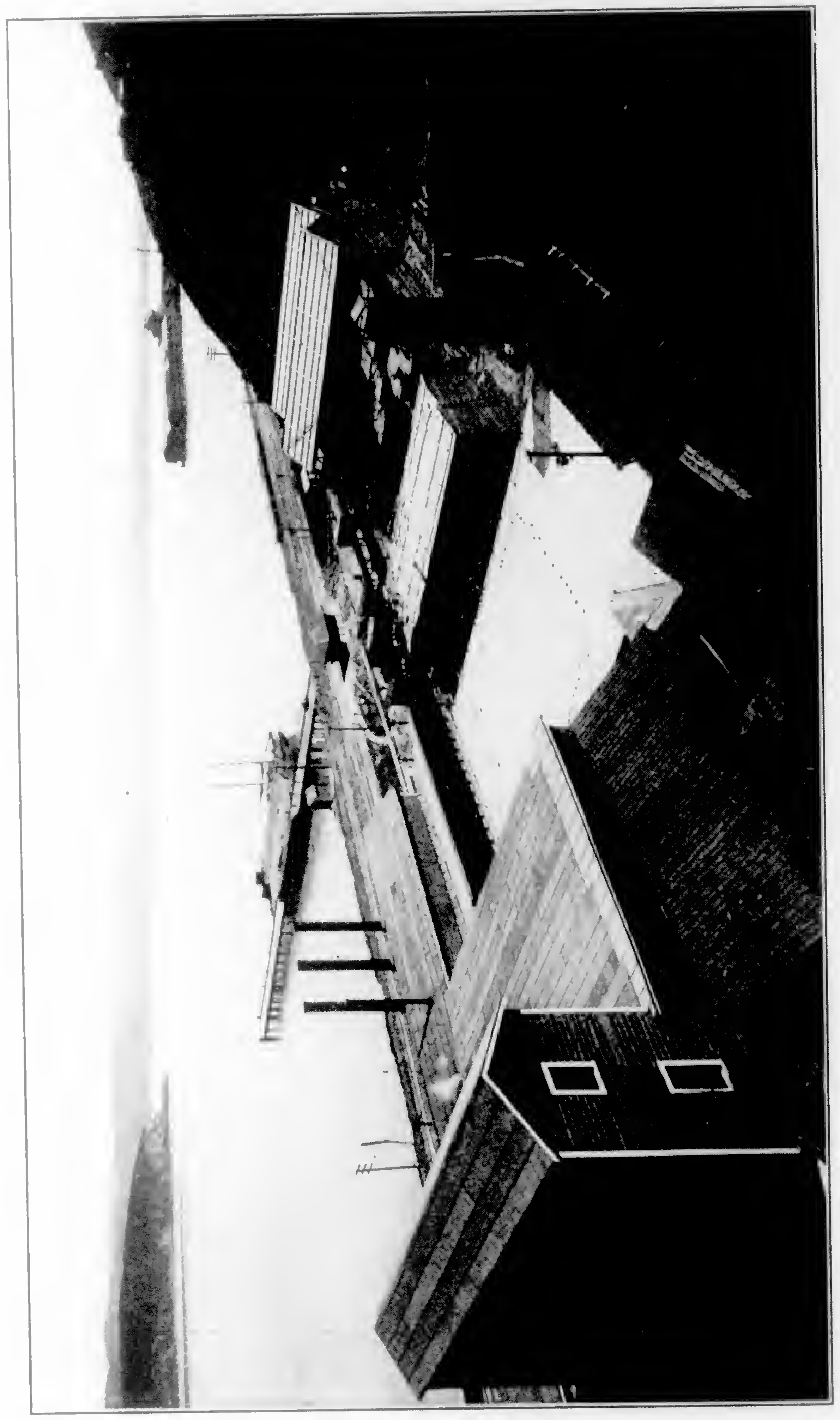
* * *

Structural Material Output in California

CALIFORNIA industries devoted to the production and utilization of mineral structural materials in the State made a fine record last year. State Mineralogist Aubrey reports that their output was $9,225,000 in round figures. The total is somewhat in excess of that, and the final returns may make a handsome addition. Practically all reports have been received, but in a few instances the figures have not been secured. The total of $9,225,000 shows an increase of $1,366,000, as compared to the aggregate for the preceding year. The quarrymen and producers and workers of clay in 1907 practically added as much wealth to the State as did the petroleum wells of California in 1906, when petroleum was the second mineral product in commercial importance.

The figures that have been received to date from the producers of California structural materials for the year 1907 leave the showing without final revision, with annual records as follows:

Paving blocks, $200,440; lime, $743,740; limestone, $388,014; cement, $2,291,077; granite, $451,085; rubble, $682,996; slate, $60,000; serpentine, $3000; glass sand, $8178.80; sandstone, $100,184; marble, $97,863; clay (pottery), $219,179; brick, $2,965,770; macadam, $951,198.15. The largest increase, as compared to 1906, is to be credited to the brickmakers, who led their record of the preceding year, who increased their output from $2,538,848 to $2,965,770, or practically $425,000. The lead is then taken by the cement men, whose output in 1906 was $1,941,250, and in 1907 was $2,291,077, a gain of about $325,000. There were increases in lime and limestone; an increase of more than $100,000 in granite; a substantial gain in the production of macadam for the State; more than $100,000 increase in the rubble produce, and clay for pottery was more in demand.



Power House, Elevator and Machine Buildings of the Carquinez Brick Company

How Bricks are Made by Modern Methods

TO THOSE who have seen only an old-fashioned brickyard in which the clay is dug from the ground, pressed into moulds by hand and spread out to dry in the sun before burning in the kilns, the making of bricks by modern methods must impress them with the great advance that has been made in this branch of manufacture. If they desire to begin at the beginning, their first question would naturally be: Where does the clay come from? A visit to the plant of the Carquinez Brick & Tile Company revealed some interesting facts.

The clay as taken from the bank is first ground in mills known to brick men as dry pans. These dry pans are heavy machines each weighing 36,000 pounds, consisting of an iron pan nine feet in diameter, which revolves on a vertical shaft under heavy mullers, grinding the clay as it is fed to the machine by the workmen. It is then forced through a screen into concrete wells over which the dry pans are set, then hoisted by an elevator to the top of a three-story building, where it passes over a screen of piano wire into large hanging wooden boxes from which it falls on a conveyor belt which carries it in a continuous stream to the large steel clay bins.

It then goes down a chute into the pug-mill. Here it is thoroughly mixed with water to the proper consistency and forced by heavy double winged augurs through a die the size of a brick, forming a continuous column which is carried by a belt to the cutter. This machine consists of three rows of wires with twenty-three wires to the row, continuously revolving cutting twenty-three bricks at a time.

From the cutter the bricks are carried by what is called an off-bearing belt, which separates the green bricks just enough to enable the man to pick them up. They are then loaded on dryer-cars holding 600 bricks each, and are run into the dryer.

The dryer consists of sixteen tunnels built of reinforced concrete, each holding sixteen cars, under which are conduits through which hot air is forced by a large 12-foot fan run by a 20 horse-power engine running continuously day and night. The exhaust steam from the engine in connection with one oil burner is utilized for the purpose of heating the dryer.

After remaining in the dryer for from 50 to 60 hours, the bricks are then removed to the kilns where they are fired for from six to seven days, then three days are allowed for the cooling and they are ready for the market.

At present the company is making only common brick, but it is the intention in the near future to manufacture fire-proofing, conduits, roofing tile, and clay shingles, besides pressed and vitrified brick.

* * *

Definition of Bungalow

The following from an English building journal will be of interest: What is a bungalow? The term used to be applied to a simple one-story structure of a more or less temporary character. "The bungalow of today," says the Tatler, "is a very luxurious affair. Except that all the rooms are kept on one floor, it is quite as substantial as the average country cottage or house, and even in the matter of rooms on one level many bungalows have now one or two bedrooms on an upper floor. In fact, the modern bungalow is distinguished from the average house more by the studied rusticity of appearance, which consorts admirably with its surroundings, than by any material difference in its accommodation. And allied to other advantages it is comparatively cheap." This strikes us as an unnecessarily loose use of the word, for according to this definition, nearly all modern country houses are bungalows.

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Plant of Carquinez Brick Company. Clay Bank (Blue Shale). Inexhaustible

Reinforced Concrete Bridge Across Sycamore Slough, Colusa County, Cal.
Charles de St. Maurice, County Surveyor

A Reinforced Concrete Flat Slab Bridge

By CHARLES DE ST. MAURICE, C. E.

DURING the last few years there have been erected in California numerous arch bridges and culverts of reinforced concrete, but few of the flat slab type designed to carry heavy loading. In the instance that we herein cite, a structure erected recently in Colusa county, the flat slab type was adopted because of its economy in comparison with the arch for the required span and loading.

The new bridge spans Sycamore Slough and replaces an old wooden structure, 84 feet in length, which was erected about thirty years ago, since which time the cost of maintenance and repairs has been more than sufficient to erect two concrete bridges of this type. A general description of the structure is as follows:

The foundation is on redwood piles driven into wet sand and capped into the footing course of concrete masonry which carries the end-bearing walls, the latter also acting as retaining walls for the approach fill. The loads on the bridge are transmitted to the end-bearing walls by means of a 10-inch floor slab and two side girders, which form the parapet walls and are surmounted with a gas-pipe railing. The accompanying cut shows clearly the details of construction.

The concrete consisted of a wet mixture of one to six of domestic Portland cement and Sacramento River sand and gravel.

The contractor received his materials and was prepared to proceed with his work before the tests of the cement could be obtained and under his guarantee that the cement would meet the requirements of the Standard Specifications of the American Society of Testing Materials, and because of approaching inclement weather, he was permitted to proceed with his work. The tests were later developed, showing the cement to favorably meet the requirements as regards chemical analysis and strength, but failed under the test for soundness, particularly under the boiling test.

The structure was, however, completed by this time and bore every appearance of first-class work. Owing to the failure of the cement under test for soundness, the county surveyor was precluded from accepting the structure outright, but recommended that the board of supervisors pay the contractor under bond guaranteeing the structure for one year, during which time the

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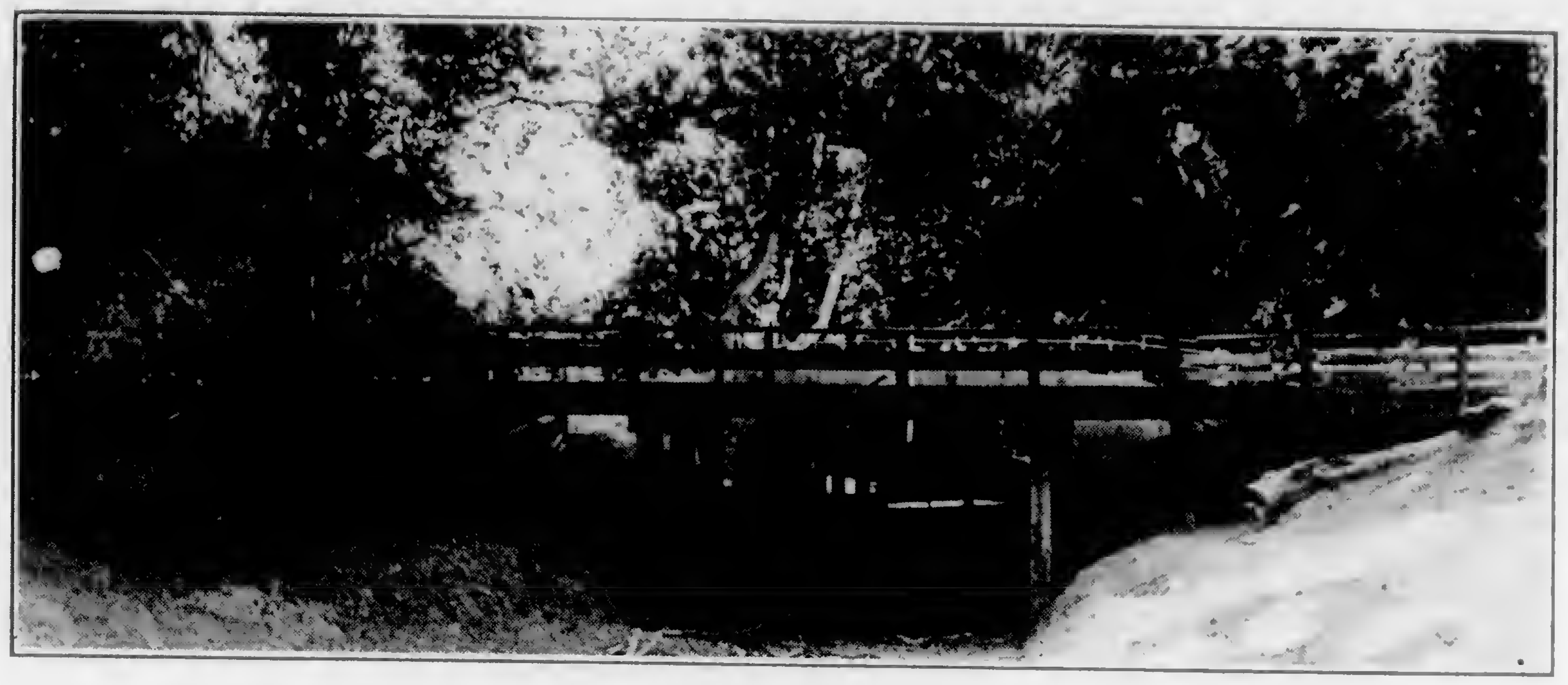

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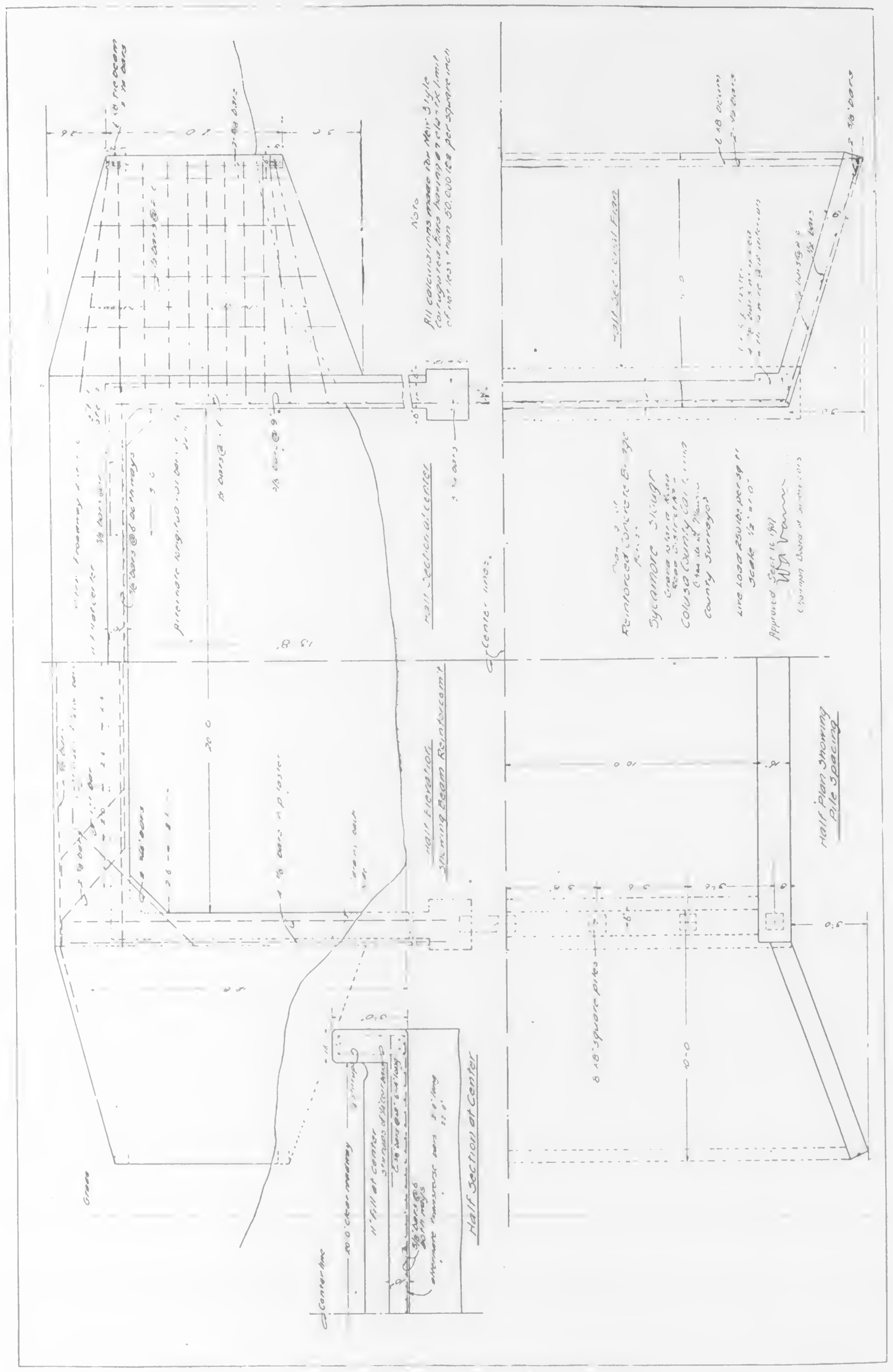
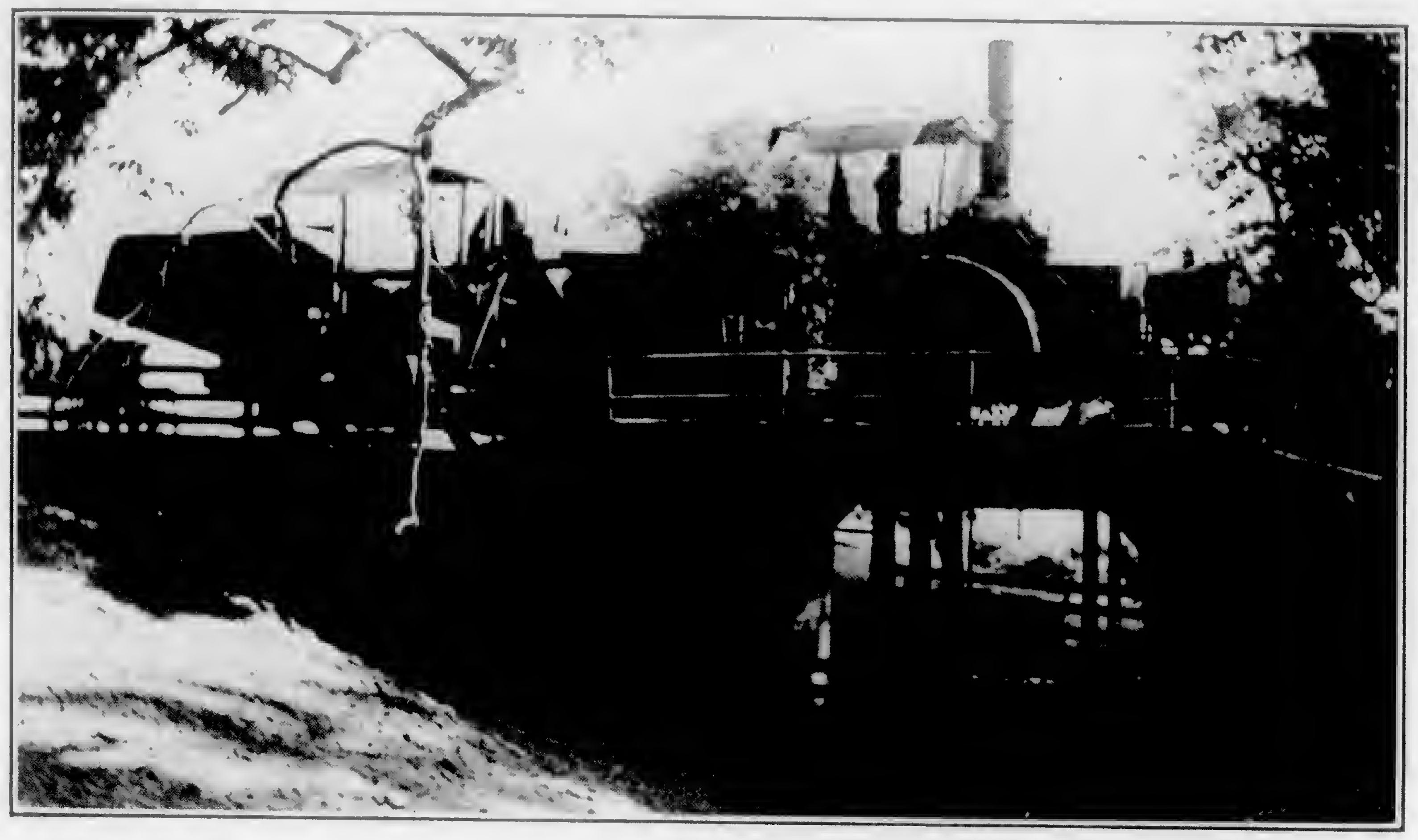

Note
All computations made for New Style corrugated bars having elastic limit of not less than 50,000 lbs per square inch
Half Section at Center
Half Section at Flare
Reinforced Concrete Bridge
Sycamore Slough
Colusa County
County Surveyor
Live Load 250 lbs per sq ft
Scale 1/2"=1'0"
Approved Sept 16 1907
Center lines
Half Elevation showing Beam Reinforcement
Half Plan Showing Pile Spacing
8-18" square piles
Half Section at Center
Grade
Center line
3/8 bars



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elements of the four seasons will act upon it, and should, in that time, develop any evidence of disintegration.

The writer does not desire to be understood as approving work constructed with materials that fail under standard tests, but considers this particular work one of the exceptional cases that will endure notwithstanding the failure of the cement under the test for soundness.

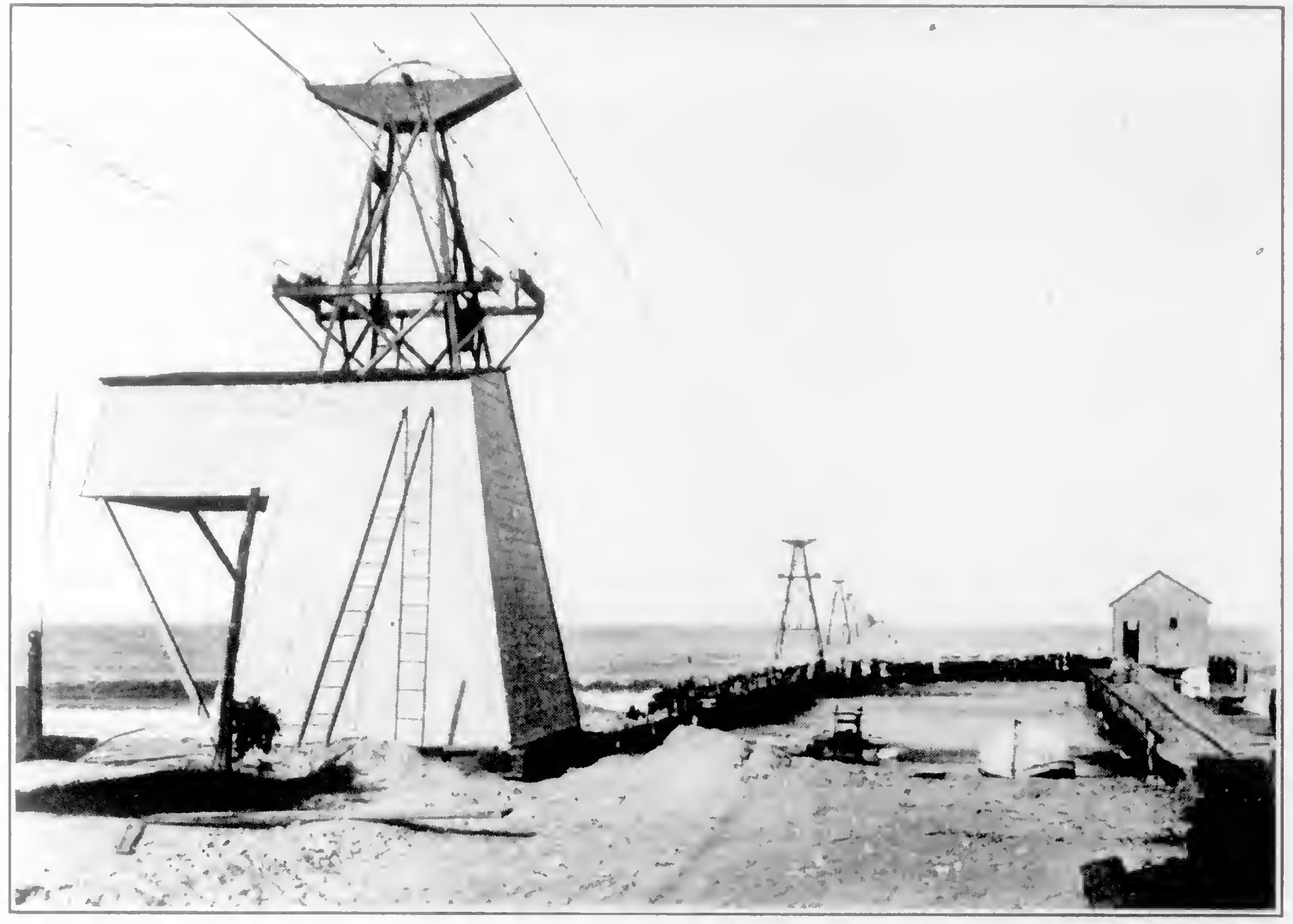
The accompanying cuts show the structure with a test load, consisting of a twenty-ton traction engine. The deflection of the girders with this load was zero, and 2-1000 of an inch at the centre of the floor slab. The reinforcement for the concrete was corrugated bars.

* * *

A Crying Need for Cheap Tile Roofing

"THE day is coming," said the Colonel, "when we will want and demand something better than wooden shingles for roofing purposes, in the construction of our moderate cost buildings. I do not know much about the clay roofing tile business, but from the way they are making other kinds of tiling, for hearths, mantels and things like that, for example, it strikes me that your clay people might turn their searchlight on this roofing tile question and unearth something good. What we want is something to take the place of shingles, and something that is not too heavy and too difficult to put on. Ordinarily tiling is too heavy to please the lumber yard man for the average dwellings, but if you can devise a way to successfully manufacture a plain light roofing tile, and can reduce the cost of manufacture down where it won't make the roof cost too much as compared to the rest of the house, there is practically no limit to the quantity that might be sold. I think, too, that this is a more plausible and likely pipe dream to realize than the one you have just been wrestling with, but I really don't know anything about it except that there is room to market something of this kind if you can only get something that will fill the bill."

"What about the chance for enlarging the market for brick among the lumber people?" I asked. "Is there not a chance to build that up considerably by a campaign of education, especially now that structural lumber has gone up so high?"—Clayworker.



Aerial Tramway, Southwest Land and Lake Tunnel

Driving Steel Sheeting

The Aerial Tramway for Chicago Southwest Land and Lake Tunnel

By FRANK C. PERKINS,
Consulting Electrical Engineer, Erie County Bank Bldg., Buffalo, New York.

THE accompanying illustrations show the equipment of the Aerial Tramway for Chicago Southwest Land and Lake Tunnel construction. It is stated that the object of the towers and cableway is for the transportation of material and men from the shore to the intermediate crib and return, at any and all times. This is necessary in construction work in Lake Michigan as during the winter months it would be impossible to land scows at the intermediate crib.

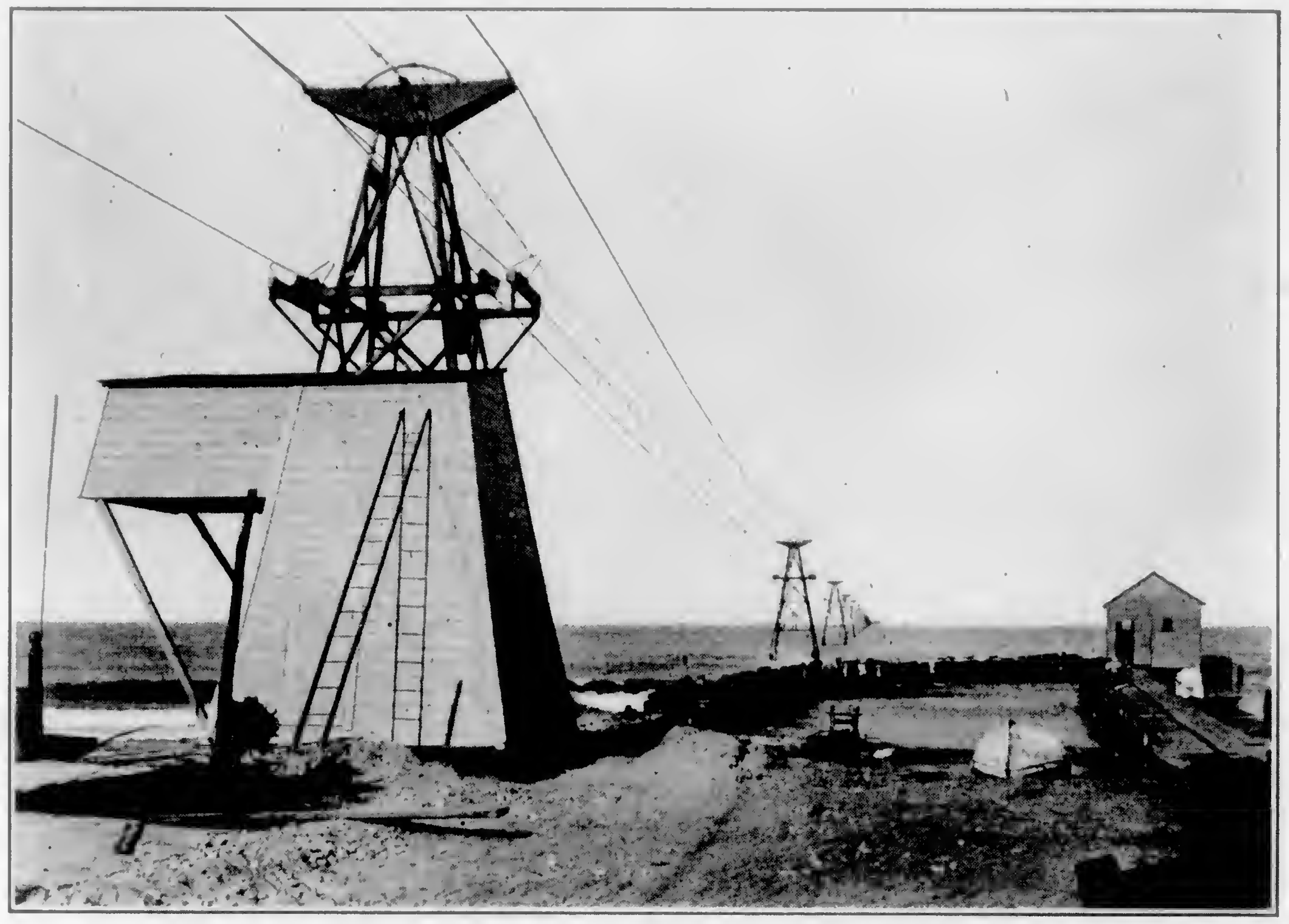
It will be noted that there are twenty-six towers supporting the cableway. The towers are constructed of steel. They are twelve feet square at the bottom and about three feet square at the top, with a channel iron frame construction at the top to support the carrying cables and with sheaves, etc., for supporting the transmission cables. The towers are 30 feet high and are set on steel piles, the bottom of the towers resting five feet above the water level, thus making the top of the towers 35 feet above the water level.

The diameter of the large cable, or carrying cable, is 1⅜ inches. The diameter of the transmission cable is ⅞ inch. It has not yet been decided whether there will be any more towers constructed from the intermediate crib to the permanent crib. The towers are spaced from 300 to 350 feet apart. There is no objection on the part of the United States government to furnish construction that we know of.

It is stated that the towers are to be lighted by anchor lights as provided by the marine laws of the United States government. They will also be lighted with two 64-candle power incandescent lamps. The depth of the water varies from 10 feet in depth near the shore to 33 feet in depth at the intermediate crib. The towers are supported on four steel piles, made up of two plates with connection angles to form one-half of a square of 12 inches. These piles are driven 14 feet into the bottom of the lake and extending 5 feet above the water. The cableway extends from the shore terminal to the lake terminal, about 8000 feet. The cost of this cableway construction was $75,000.

Over two miles is the total length of the tunnel of which approximately 1660 feet is on land and the remainder constructed under Lake Michigan. The land tunnel terminates at Seventy-third and Railroad avenue. The diameter of the lake tunnel is 14 feet on the inside, with 12 inches of concrete around the same, making diameter of excavation 16 feet. The horse-power required is the same as that to work the cableway—about 15. The diameter of the land tunnel is the same as that for the lake tunnel.

It is held that the cost of this section of the Southwest Land and Lake Tunnel will be approximately $1,600,000 and will be completed on or before March 1, 1909. It is maintained that the capacity of the cableway is about 400 cubic yards of material every ten hours. The candle power of the searchlight at Seventy-third street is 18,000. Speed of cableway is approximately 350 feet per minute and it takes the bucket about 23 minutes to travel from the shore to the intermediate crib. The buckets will be spaced about 300 feet apart and will be automatically connected to the transmission cable as they go out and will be automatically released as they reach the terminals.



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Class "A" Buildings for Municipalities*

By C. F. WIELAND, Consulting Engineer

IT IS no doubt the thought of the majority of architects, engineers and contractors that the erection of more lasting buildings should be encouraged but we often lose sight of the fact that all buildings should be protected against fire, whether the buildings be of so-called "fire-proof" construction or of the inflammable type.

We are, by the inventive genius of man, in enjoyment of time saving appliances and comforts that were but vaguely dreamed of in the days of our grand-parents, and it seems but natural now for us to seek the best in everything.

As a general rule the possible—not the prospective—net income a building will bring, limits the investment and consequently governs the kind of material the building is to be made of.

The most desirable in buildings costs more than the commonplace, the rentals being higher in proportion to the cost, which fact should be recognized just as the price of an all-wool garment is known to exceed that at which one of shoddy can be bought for. We should be ready to pay fair for being inside the best of both these necessities. Each has a greater period of usefulness and presents the most attractive appearance throughout.

You seldom hear of the failure and abandonment of a town or city but do frequently learn of the bankruptcy and selling out of commercial enterprises. May we not learn from the really successful private concerns which are in our midst a sound lesson for the conduct of so extensive a business enterprise as is represented in the affairs of a municipality?

Municipal buildings should be properly designed and so well built as to ensure a long and useful existence. We should begin with the fire engine houses and look to the comfort and safety of those men upon whom we rely to save us from the dread demon of fire—who may often be the creature of our own folly. There is every reason for making the fire-engine houses of first-class construction for of all the city buildings their floor space is seldom extended; in fact, each house is designed for a known crew of men and apparatus and the houses are located to serve quickly a certain territory. The more thickly a place is built up the greater is the need for additional houses. The houses should be built class "A" througout, that is: steel frame with reinforced concrete walls floors and roof, or reinforced concrete entirely. During the earthquake of April 18, 1906, Fire Chief A. T. Sullivan of San Francisco was killed by the falling of the tower of the California Hotel through the roof of Chemical House No. 3. Also as a fireman was endeavoring to escape by a rear window out of Engine House No. 4 he was killed by the falling of a wall. In San Jose, Paul Furrer, Captain of Truck No. 1, was killed by a falling front wall of the engine house as he was trying to escape from the building.

The Pacific Borax Company, Alameda, has a reinforced concrete warehouse built many years ago by Mr. Ransome. The roof alone was of wood. The top of the brick chimney of their power plant was thrown down by the earthquake, crashed through the roof but was stopped in its flight by the reinforced concrete top floor. It is safe to presume that had the roof been of reinforced concrete the chimney would not have gone through. It is entirely possible that if the roof of Chemical House No. 3 had been of reinforced concrete that Chief Sullivan would have been alive to direct the efforts of his men in the troublesome days following the shock.

In almost every emergency the fire department is called upon to help us, and as the men are trained to keep their heads in peril we should safeguard them in our own interest. I affirm that absolutely nothing should be allowed to interfere with our putting up fire-houses of class "A" construction. Men to harness horses and operate fire-fighting apparatus cannot be secured out of a helpless crowd.

The education of children is also a permanent undertaking of a municipality. A teacher can properly instruct but a limited number of students, hence the size of the rooms is at once defined. The pupils should not have to walk great distances to school; therefore a school building is so located as to serve a limited number of city blocks. We thus see that a school has to fill a certain demand constantly. Sound business reasoning, practiced by the successful merchant, dictates that in a case of this kind buildings of lasting character should be constructed and the bond issue for the improvement extended over a greater number of years, so that the tax burden may be shared by a coming generation to whom the benefit will also extend.

However, if a community feels unable to put up class "A" school buildings it can at least protect the cheaper structures against accidental or malicious fire by installing in each building an automatic sprinkler equipment—of which there are a number of well-tried and approved types. This system, as you doubtless know, consists of an overhead watertank connected to a series of water pipes having sprinkler heads or outlets so distributed that at least 100 square feet of the ceiling area are protected by every sprinkler. The sprinklers are opened automatically by the heat melting a fusible link by which they are sealed.

The recent school fire at Collinwood, Ohio, in which about 175 children lost their lives, is fresh in your minds. Probably the burial expenses the parents had to pay reached $15,000; half of that sum might have paid for a sprinkler equipment and would undoubtedly have prevented the destruction which took place. The value of the children's lives is beyond calculation. From an economic standpoint the earthly existence of 175 consumers and prospective producers was cut off.

Wide halls, outward swinging unlocked doors, fire escapes and fire-drills are all necessary; but, remembering that the human mind is apt to go into a panic when least expected, we should use the best available contrivances that will operate automatically when needed.

A progressive community spends money liberally, through its Chamber of Commerce and other bodies, in inducing people to settle in its midst and it should be equally awake to the necessity of protecting the people who are already there.

Business men are realizing that a sprinkler system effects a great saving in insurance expense and it follows that the rates on a school house will be much reduced.

Remember this: a sprinkler system does not depend upon horses, fire-engines, men and condition of streets, nor the quick turning in of a fire alarm. Every sprinkler becomes a lively hoseman when the soft spot in its head is touched by heat and it gets busy instantly.

Not only does the owner enjoy a peaceful mind, freed of the anxiety that his life's work may be wiped out during the night, but his books will show him that the saving in insurance premiums will, at the new rate, pay for the sprinkler system in from three to five years. He will also be able to get a volume of insurance which in many cases was previously denied him. It is also possible to insure against loss occasioned by the accidental action of a sprinkler.

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* Extracts of paper read at Annual Banquet of the San Jose Builders' Exchange, April 4, 1908.

The insurance underwriters are deeply concerned in the prevention of fire, both in their own interest and that of the assured—and the reduction in losses points logically to a reduction in cost of insurance—as seen by the following remarks to me by one on their Inspection Staff:

"An argument in favor of an automatic sprinkler equipment, or in fact any good fire protection, is that such protection goes a long way toward assuring the permanence and continuity of a business, a very important matter, particularly for a manufacturing concern which might find it very difficult to recover its trade after a fire has given its rivals the opportunity to capture its customers.

"A case in point is that of a sawmill in Northern California. It burned down just at the time when lumber was at its best price, and deprived the owners of the large returns they would otherwise have had. Their new plant is now protected by automatic sprinklers."

It is my profession to design fireproof buildings but I would be faithless to my fellow men if I did not point out the very simple means of protecting the buildings now existing and the ones of more modest cost which may have to be built in the future. That sprinklers are effective is proven by the fact that the average fire loss in sprinkler equipped risks is about $260.00, as against the average fire loss of about $7,200.00 sustained by the same class of buildings not so protected. The Sprinkler Fire Tabulation in the 1907 Proceedings of the National Fire Protection Association shows that only six per cent of the fires which occurred in buildings having sprinkler equipments were considered "unsatisfactory" from the inspectors view point. Eighty per cent of the "unsatisfactory" fires were really due to antiquated equipment, water failure, freezing, etc., consequently out of 887 fires only eleven can really be considered as "unsatisfactory" five of which were due to exposure.

* * *

Concrete Blocks Stand Severe Fire Test

TO THE Architect and Engineer:—We would like to direct your editorial department's attention to the fact that at the recent terrible conflagration at Fernie, British Columbia, where practically the whole town was wiped out of existence, only three buildings remained standing in the business portion of the city. These were all built of concrete blocks.

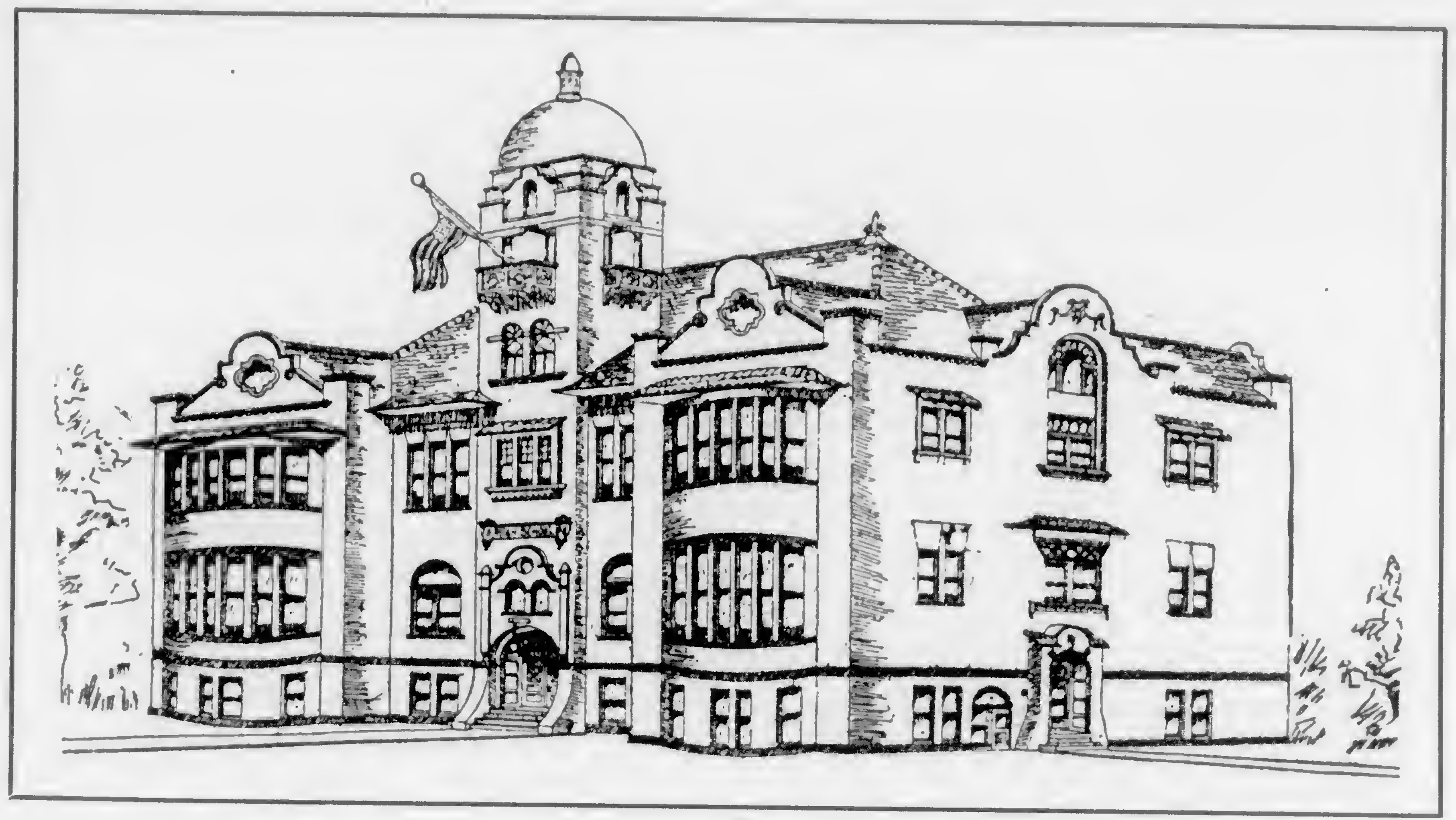
The history of the concrete block industry shows no such severe test being put upon concrete blocks where comparison could be made of their fire-resisting qualities with brick or stone. All around were brick buildings and some stone structures, all of which were destroyed, demonstrating more conclusively than has ever taken place in the past, the absolute superiority of concrete over stone or brick as a fire-resisting material. The merchants of Fernie have almost without exception decided to rebuild of concrete blocks even though, in so doing, they should have to build smaller structures to keep within the amount they have available for building. There is ample food for reflection in this.

At present the insurance companies place a handicap of about thirty per cent on concrete block buildings, which is unjust, absurd and, in the face of recent evidence, absolutely ridiculous.

Hoping you will give the matter the publicity it deserves, we beg to remain,

Yours very truly,

CONCRETE ENGINEERING & CONSTRUCTION CO., LTD.,
Vancouver, B. C. Per Francis S. Keith.



High School at Medford, Oregon. Chas. H. Burggraf, Architect

How to Make Cement Blocks

The following directions for making cement blocks are given by an exchange:

For brick of the ordinary class, use 600 pounds of Portland cement and 40 cubic feet of sand and fine gravel; for fine face brick, use 800 pounds of cement and 40 cubic feet of torpedo sand; for a cement brick, equal in every respect to the pressed brick of commerce, use 1,000 pounds of cement and 40 cubic feet of torpedo sand.

The following figures are also of interest:

A 1:3 brick takes 3.8 barrels of cement and 1.7 cubic yards sands per M.
A 1:4 brick takes 3.05 barrels cement and 1.8 cubic yards sand per M.
A 1:5 brick takes 2.55 barrels cement, and 1.18 cubic yards sand per M.
A 1:6 brick takes 2.18 barrels cement and 1.9 cubic yards sand per M.
A 1:7 brick takes 1.9 barrels of cement and 2 cubic yards sand per M.

An exchange gives the following method for testing sand for cement:

"The best practice requires that sand shall be 'suitable silicious material, passing a one-quarter inch mesh sieve, clean, gritty and free of impurities.' A good test of sand is to rub it between the hands, using considerable pressure. The sharpness of the grains and the absence of foreign material may both be determined in this way."

* * *

Tall Buildings Not Profitable

Skyscrapers more than twenty stories in height are not profitable. The cost of operating elevators sufficient to safeguard the tenants makes the cloud piercing building uneconomical. Such were the opinions of the building managers from all the large cities in the country who met in convention at the Auditorium, Chicago, to discuss questions of systematic management of skyscrapers. The convention is the first of its kind ever held and it probably will result in the formation of a national association of building managers.

Among the Architects

American Institute of Architects

(ORGANIZED 1857)

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For Three Years—Frank Miles Day, Philadelphia; R. Clipston Sturgis, Boston; George Cary, Buffalo, N. Y.

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get a volume of insurance which in many cases was previously denied him. It is also possible to insure against loss occasioned by the accidental action of a sprinkler.

The insurance underwriters are deeply concerned in the prevention of fire, both in their own interest and that of the assured—and the reduction in losses points logically to a reduction in cost of insurance—as seen by the following remarks to me by one on their Inspection Staff:

"An argument in favor of an automatic sprinkler equipment, or in fact any good fire protection, is that such protection goes a long way toward assuring the permanence and continuity of a business, a very important matter, particularly for a manufacturing concern which might find it very difficult to recover its trade after a fire has given its rivals the opportunity to capture its customers.

"A case in point is that of a sawmill in Northern California. It burned down just at the time when lumber was at its best price, and deprived the owners of the large returns they would otherwise have had. Their new plant is now protected by automatic sprinklers."

It is my profession to design fireproof buildings but I would be faithless to my fellow men if I did not point out the very simple means of protecting the buildings now existing and the ones of more modest cost which may have to be built in the future. That sprinklers are effective is proven by the fact that the average fire loss in sprinkler equipped risks is about $260.00, as against the average fire loss of about $7,200.00 sustained by the same class of buildings not so protected. The Sprinkler Fire Tabulation in the 1907 Proceedings of the National Fire Protection Association shows that only six per cent of the fires which occurred in buildings having sprinkler equipments were considered "unsatisfactory" from the inspectors view point. Eighty per cent of the "unsatisfactory" fires were really due to antiquated equipment, water failure, freezing, etc., consequently out of 887 fires only eleven can really be considered as "unsatisfactory" five of which were due to exposure.

* * *

Concrete Blocks Stand Severe Fire Test

TO THE Architect and Engineer:—We would like to direct your editorial department's attention to the fact that at the recent terrible conflagration at Fernie, British Columbia, where practically the whole town was wiped out of existence, only three buildings remained standing in the business portion of the city. These were all built of concrete blocks.

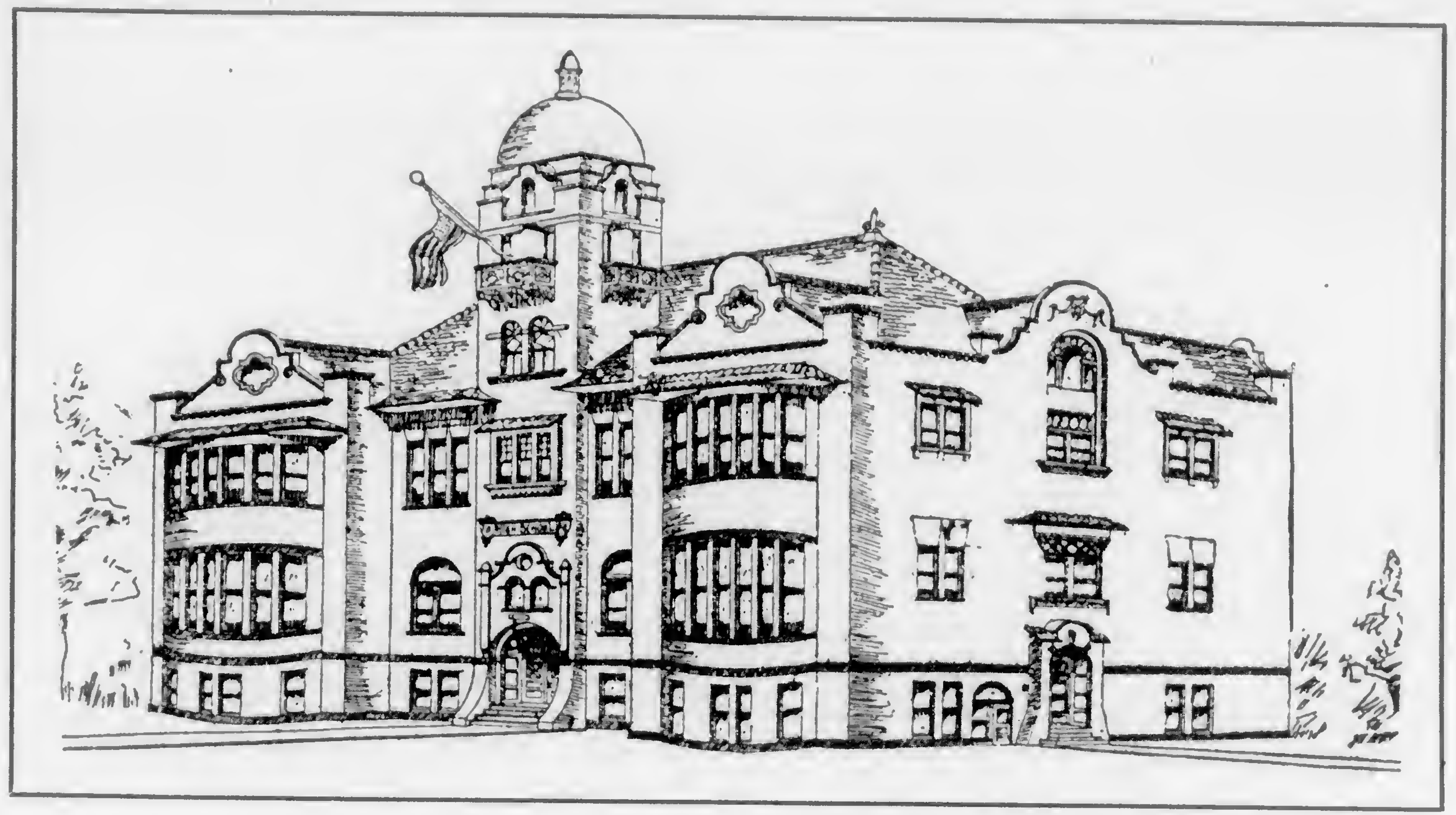
The history of the concrete block industry shows no such severe test being put upon concrete blocks where comparison could be made of their fire-resisting qualities with brick or stone. All around were brick buildings and some stone structures, all of which were destroyed, demonstrating more conclusively than has ever taken place in the past, the absolute superiority of concrete over stone or brick as a fire-resisting material. The merchants of Fernie have almost without exception decided to rebuild of concrete blocks even though, in so doing, they should have to build smaller structures to keep within the amount they have available for building. There is ample food for reflection in this.

At present the insurance companies place a handicap of about thirty per cent on concrete block buildings, which is unjust, absurd and, in the face of recent evidence, absolutely ridiculous.

Hoping you will give the matter the publicity it deserves, we beg to remain,

Yours very truly,

CONCRETE ENGINEERING & CONSTRUCTION CO., LTD.,
Vancouver, B. C. Per Francis S. Keith.



High School at Medford, Oregon. Chas. H. Burggraf, Architect

How to Make Cement Blocks

The following directions for making cement blocks are given by an exchange:

For brick of the ordinary class, use 600 pounds of Portland cement and 40 cubic feet of sand and fine gravel; for fine face brick, use 800 pounds of cement and 40 cubic feet of torpedo sand; for a cement brick, equal in every respect to the pressed brick of commerce, use 1,000 pounds of cement and 40 cubic feet of torpedo sand.

The following figures are also of interest:

A 1:3 brick takes 3.8 barrels of cement and 1.7 cubic yards sands per M.
A 1:4 brick takes 3.05 barrels cement and 1.8 cubic yards sand per M.
A 1:5 brick takes 2.55 barrels cement, and 1.18 cubic yards sand per M.
A 1:6 brick takes 2.18 barrels cement and 1.9 cubic yards sand per M.
A 1:7 brick takes 1.9 barrels of cement and 2 cubic yards sand per M.

An exchange gives the following method for testing sand for cement:

"The best practice requires that sand shall be 'suitable silicious material, passing a one-quarter inch mesh sieve, clean, gritty and free of impurities.' A good test of sand is to rub it between the hands, using considerable pressure. The sharpness of the grains and the absence of foreign material may both be determined in this way."

* * *

Tall Buildings Not Profitable

Skyscrapers more than twenty stories in height are not profitable. The cost of operating elevators sufficient to safeguard the tenants makes the cloud piercing building uneconomical. Such were the opinions of the building managers from all the large cities in the country who met in convention at the Auditorium, Chicago, to discuss questions of systematic management of skyscrapers. The convention is the first of its kind ever held and it probably will result in the formation of a national association of building managers.

Among the Architects

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TAFT FOR PRESIDENT

Of course there is no doubt about the election of Secretary Taft. His nomination for President by the Republicans has been as well received in the Northwest as in the Middle West and East. The feeling is general that Taft will succeed his friend, Roosevelt, as a matter of course and that with his election will come renewed confidence and abundant prosperity.

Secretary Taft is such a candidate as is presented but once in generations. It seems as if he was chosen by the inscrutable hand of destiny to lead the country from its present position of industrial unrest and financial stringency into an era of boundless prosperity and unbroken confidence. He is a man of the people, and is in every respect free from narrowness, subserviency to class interests and vindictiveness. He is himself a platform.

On every proposition he is sound, dignified, and progressive. Though he will be as firmly opposed to monopolies as is President Roosevelt, he will give us the best phases of the Roosevelt policies, without some of the objectionable features of mere Rooseveltism.

Mr. Taft is a tireless worker and is a worthy disciple of the strenuous life. He is most unassuming and modest—a friend of the people and esteemed and respected by all with whom he has come in contact.

Eugene Field might well have had him in mind when he wrote:

"My father calls me William,
My mother calls me Will,
My sister calls me Willie,
But the boys call me Bill."

COMPETITION FOR PUBLIC OBSERVATION STANDS

For the first time in the history of political inaugurations, architectural design by skilled members of the profession will be a feature of the street stands for spectators at Washington next March. The National Society of Fine Arts, the Washington Architectural Club and the Washington Chapter of the American Institute of Architects have appointed a joint committee to invite competitive plans for design and arrangement along the route of the inaugural procession. It is proposed to offer prizes of $300, $200 and $100 for the best three designs, which in this case will become the property of the committee, and will be published for the benefit of those interested in the subject. The committee consists of Joseph C. Hornblower, Leon E. Dessez, Waddy B. Wood, Leander Ashford and Percy Ash all of Washington. The last named architect will supply details. Of course the main object of the competition is a patriotic one, and should receive the attention of the architects of the country to a greater extent than if large money prizes were offered. The jury of award consists of J. R. Marshall, T. J. D. Fuller, Frederick D. Owen, Frank D. Millet and John B. Larner, in whose hands the drawings will receive consideration.

SAN FRANCISCO ARCHITECTS SIGN WORK

The example set by one or two prominent Eastern architects in signing their work has found favor with at least one Pacific Coast firm. MacDonald & Applegarth, Call building, San Francisco, have adopted a neat bronze name plate which is made a permanent fixture on a prominent corner of each of their buildings. The plate is modest in size and contains the simple inscription: "MacDonald and Applegarth, Architects." No date or address are given. The letters are large enough to be seen from the street, but they are not that large that they disfigure or mar in any way the beauty of the building.

In adopting this new fad the San Francisco architects have taken a step in the right direction. For several years the question of signing architects' names to buildings has been a much mooted one by members of the American Institute of Architects, and there has been a diversity of opinion as to the feasibility of the plan. Some have inclined to the belief that it cheapens the work and in a way lowers the high standard of the profession. The ruling sentiment of the profession, however, is that it is entitled to the same privilege of signing its work as the artist and sculptor enjoys. Then again, if an architect knows his name is to appear on his work he is likely to be more careful with his plans, developing the best there is in him, for he knows that with his name in full view of the public, he is likely to be severely criticised if his work is not done well.

We hope other architects on the Pacific Coast will join with the San Francisco firm in a movement that is in every way commendable and in keeping with the ethics of the profession.

SAMUEL NEWSOM

SAMUEL NEWSOM, a well-known architect of San Francisco, and resident of Oakland, died suddenly on the deck of a Key Route ferry boat on September 1. An hour before he had lunched with his son, Sidney, and had left for home declaring that he felt ill. Heart disease is supposed to have caused his death.

The boat was nearing the Oakland mole when Newsom suddenly fell over on the deck and expired almost instantly. The body was brought back to San Francisco and taken to the harbor hospital, later being removed to the morgue.

For many years Mr. Newsom was associated with his brother, J. Cather Newsom. Among the large buildings which the firm designed were the Rudolph Spreckels residence in San Francisco, the city hall and the courthouse in Oakland. Later J. Cather Newsom withdrew from the firm and Samuel Newsom associated himself with his sons, Sidney and Noble, who are now the junior members of the firm which has its offices in the Humboldt Bank building.

Newsom was 61 years of age and a native of Canada. He went to Oakland when only eight years of age, and had made his home in that city ever since. His only living brother is J. Cather Newsom, a member of the State Board of Architects.

Newsom was a prominent Mason. He had been a sufferer from heart trouble for many years.

HEATING AND LIGHTING

Material Arranged by Carl E. Roesch, Edwin B. Pike
and Wm. E. Leland, S. B.

The Illuminating Engineer

PART II. — By C. E. Roesch

THIS department, in last month's issue, devoted some little space to a discussion of the various factors which enter into the proper illumination of a structure from an engineering point of view.

In the alphabetically arranged tabulation of these factors, "The decorative importance of the lighting instrument" was given as the last consideration, but the illuminating engineer who will get the best results is the one who will give this question more than passing thought.

The architect and lighting specialist are, and should be, friends and the only reason the illuminating engineer was not at once welcomed by the architect and given the same consideration as the structural or concrete engineer was the fear that his ideas and methods, being based on purely technical deductions, would be at variance with the architect's interpretation of the aesthetic importance of the interior treatment, and there would be a lack of harmony between the engineer's plan of lighting and the general scheme of the interior as outlined by the architect.

This fear on the part of the architectural profession was not altogether without cause, as the illuminating engineer, who has been identified with this new branch of applied science since its inception, must admit for the elemental theories advanced by him gave but little thought to the decorative importance of the lighting device. This, perhaps, was only a natural fault as the very application of scientific principles to illumination was due to the fact that ornamentation had become paramount and the utilitarian purpose of the lighting instrument incidental, a fault indeed greater than the engineer's whose sin was one of omission rather than commission.

The lighting specialist, who is more or less impregnated with the "terrible taint of commercialism," soon saw that it was both necessary and possible to combine utility and beauty and it was only a natural evolution from the chrysalis of the technical lighting engineer to the present type of highly efficient engineer who utilizes theoretical and empirical rules in his mathematical calculations, combining with them a careful appreciation of the architectural and aesthetic importance of the areas he is to treat.

Modern Glass Chandeliers

THE use of glass as a material for the construction and decoration of lighting fixtures was developed to a very high degree during that remarkable period of artistic growth which included the reigns of Louis XIV., XV., and XVI., in France. The chandeliers designed for the palaces and chateaux of that period have served as models and inspirations for architects, interior decorators, and fixture designers ever since.

There is a general belief that the art of glass making reached its culmination some centuries ago, but this belief is wholly unsubstantiated by the facts. In reality, glass making in all of its branches is on a far higher plane today than ever before. The famous Hall of Mirrors in the Palace of Versailles is archaic in comparison with many a café along the "Great White Way." It will doubtless surprise many of our readers to know that no small number of the glass fixtures supposed to have been made at the time the buildings were put up are modern reproductions. It was found necessary in restoring the buildings to replace portions of the fixtures which had become broken or lost, and in many cases it was found easier to rebuild the entire chandelier than to match up the missing pieces. Of course the design was retained. In this connection, it is interesting to know

Entrance Light, Charlamagne Apartments

¶ A careful regard for design and workmanship are requisites of successful lighting that can not properly be overlooked.

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that glass chandelier ornamentations can be had in France of varying tints to match any of the old pieces. So imperfect was the art of glass making at the time these celebrated fixtures were made that the glass was either distinctly tinted when made or has become so by use. It is in this respect chiefly that modern glass making far excels ancient practice. Glass today of the cheapest and commonest sort is of a purity of color, brilliancy of lustre, and permanency of composition that was never attained by the old makers.

Most people are accustomed to think of glass as being perfectly transparent and consequently as having no color. Such, however, is not the case. To the glass maker color is the one most important item. If you will look through any piece of glass so as to get the light through the greatest possible thickness, which you can do by looking at it edgewise, you will observe a distinct tint, either run blue or violet, or a straw yellow. Furthermore, if you will put several pieces of glass of different manufacture side by side, you will also note a difference in tint. The glass used in the French chandeliers referred to is generally of a distinct violet color, but sometimes of a slightly smoky appearance also.

It is another common belief that glass is an absolutely permanent substance. While this is generally true, it is not infallibly so. The writer once saw a common lamp chimney which had dropped down into a sticky purplish-white mass from simple exposure to the air, having "deliquesced," as the chemist would say, by the absorption of moisture, and become decomposed. On one side of the Boston Common there are some old buildings in which the windows are distinctly purple, the glass having taken this hue from exposure to the light.

No better evidence of the skill of the modern glass maker can be adduced than the imitation diamonds and jewels, which, so far as mere brilliancy is concerned, even surpass the genuine. All the numerous brands of near-diamonds are simply pieces of highly refractive glass carefully cut and polished. In view of the vastly better quality of the glass itself, and the higher degree of mechanical skill available at the present time, it is not surprising that modern glass chandeliers excel in every way, except possibly originality and elaborateness of design, the famous models of the period of the Louises.

A New Incandescent Gas Burner

The electric lighting interests are not going to have things all their own way, even if their new lamps do run on one-third the current of their old ones. The Welsbach burner, which saved the day for gas when the carbon filament electric lamp threatened its total extinction, has not been indulging in any Rip Van Winkle sleep. To the question, "What are you going to do about it?" the Welsbach Company makes answer by presenting to the public its new "Junior" burner.

Undoubtedly the feature of the electric light which had most to do with its rapid introduction and enormously extended use is its extreme simplicity. It is one of the very few devices that has been put into the hands of the public in a form that is practically fool-proof. In this respect the mantle gas burner has had to admit its inferiority, and fall back upon its greater efficiency as a compensating advantage. Since progress in electric lamp manufacture has recently greatly reduced this advantage of gas, it is interesting to note that the Welsbach Company has attacked the electrical competition in its stronghold of simplicity. The Junior burner is a complete lighting unit, consisting of burner, chimney and mantle, and is practically as easy to put on and remove as an electric lamp. The price of the outfit is but 35 cents retail, less than twice the price of the ordinary 16 c. p. lamp; so that the consumer who does not wish to take the trouble to renew the mantle and chimney may simply throw the whole thing away, and replace it with a new one without feeling that he is committing any extravagance. It is not necessary, however, to throw away the burner tube, as the chimney and mantle form an easily removable part.

The burner gives about 50 c. p. rate in the same way as an electric lamp on a consumption of 1¾ to 3 feet of gas per hour. As the life of a mantle is practically the same as that of the ordinary electric lamp, and as this little burner gives four times the light, the cost of renewals if the entire outfit is thrown away is much less than that of electric lamps.

Besides the great convenience of having a self-contained unit, this burner is of such size and dimensions that it can be used with the regular electric shades and glassware. This would seem to be a real case of "filling a long-felt want." The Welsbach Company says, what is readily apparent, that the margin of profit on the burner is small, but that the demand should be sufficiently large to give a satisfactory aggregate. This burner should prove of valuable assistance to the gas companies in meeting the competition of the new electric lamps.

Incandescent Lamps—Their Use and Abuse

THE value of electrical energy, as furnished to a consumer, is not proportional alone to the amount of energy as measured by an electric meter, but is dependent upon various other factors, including the efficiency with which the electrical energy can be transformed or translated into other useful forms. The consumer uses electrical energy for securing light, heat and mechanical power; and for the transformation into these more directly useful forms various translating devices are employed. The adequacy of the service is dependent in large measure upon the efficiency of these translating devices.

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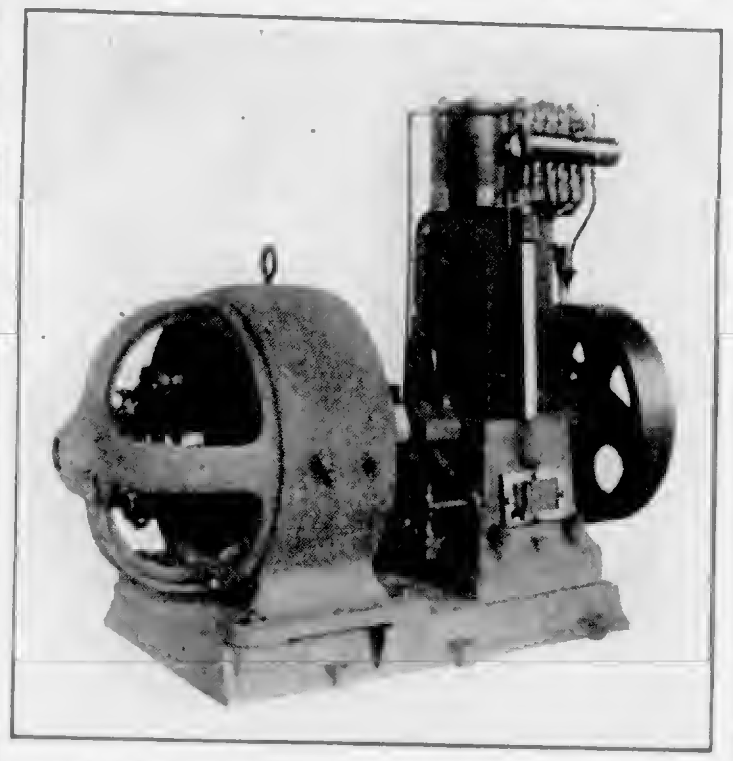

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translating devices include various forms of lamps, such as the carbon filament incandescent lamps, the tantalum and tungsten incandescent lamps, Nernst lamps, mercury vapor lamps, and the numerous types of arc lamps. For the production of mechanical power, motors of various kinds are employed, and for electrical heating, the translating devices comprise various forms of resistances.

The amount of illumination which can be secured from a given amount of electrical energy consumed in the ordinary type of incandescent lamp depends upon the design of the lamp and the materials and processes used in its manufacture, upon the voltage at which it is designed to operate, the voltage at which current is supplied to it, its period of service, the cleanliness of the outer surface of the glass bulb, as well as upon various other factors.

The ultimate life of an incandescent lamp may be expressed as the number of hours during which it will continue to give illumination, this period being usually terminated by a burning away or rupture of the filament. It is recognized as exceedingly bad practice to allow lamps to remain on circuit until this point has been reached, since the deterioration in efficiency will have become such as to make it uneconomical of operation. It is better practice and one more commonly prevailing, to express the life of a lamp as the number of hours at which it will operate at normal voltage before its efficiency falls to a value below 80 per cent of the efficiency of the lamp when new. This length of life, as commonly attained in the better grades of carbon filament lamps now manufactured, is in the neighborhood of 600 hours, and to allow a lamp to burn longer than that period usually results in what might be termed inadequate or uneconomical service, due to excessive deterioration.

One of the most common causes of poor service is due to the operation of incandescent lamps after they have depreciated below 80 per cent of their original efficiency.

It is a fact not sufficiently recognized that the accumulation of dust, oil and dirt on the outer surface of an incandescent lamp will materially reduce its efficiency, and many instances exist where the illumination may be increased from 5 to 10 per cent by cleaning the globes.

One of the most serious causes of inadequate service is insufficient size of the wires installed in buildings, causing a reduction of the voltage. This may result from poor design or false economy in the original installation, but in many instances is due to the growing demand for more current than the original installation of wiring was intended to provide for. Poor electric service may result from such inadequate wiring, even though the company may supply a satisfactory voltage to the inlet of the building. It appears to be universally true that the electric company is not directly responsible for such inferior wiring.—(From Report of Railroad Commission of Wisconsin, July, 1908.)

To Build Ice Plant.

The Union Ice Co. of San Francisco is considering the erection of an ice plant at San Diego. Options on several pieces of real estate have been secured, and if favorable arrangements can be made they will build. It is stated that preliminary plans have been made for the buildings. They will be of brick or reinforced concrete, and equipped with the latest type of machinery. About $100,000 will be invested.

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Fresh Air and Furnaces

INSTEAD of the woodwork, sometimes elaborate and expensive enough, covering up the fixtures, pipes, etc., bathrooms are now tiled, with all the fixtures and fittings open and finished in every part, thereby insuring, not only practical usefulness, but cleanliness, nor has this change stopped at the bath room; although of course, the artistic development has been more properly confined to that room, but it has extended to the kitchen, the butler's pantry, the scullery, the laundry, indeed to all parts of the house where sanitary fixtures are used; tiled walls, porcelain sinks and porcelain wash tubs practically doing away with iron and wood.

As a matter of fact it is only a few years ago that the bath room was a secondary consideration in laying out the plans for a house, and it was generally relegated to some part or space that could not be utilized for any other purpose. Today, it is almost the first thing to be considered in laying out the plans, for not only palatial residence, but even for dwellings of every modest pretentions.

In view of the fact that plumbing fixtures are now recognized as of equal, if not of paramount importance to the general furnishings of a well appointed house, it has become the almost invariable custom for parties building or remodeling to use open sanitary fixtures with as few points as possible in which microbes and filth may hide and cause no end of trouble and disease.

A trap or water seal should be provided under each fixture to prevent the admission of sewer gas into the room, to prevent this seal from siphoning connect a vent pipe back of the seal and extend up above the roof. Vent pipes should be the same size as water pipe. Use cast iron drain pipes from water closets, slop sink urinals or wash trays where the size is two inches or more, all joints to be well calked with lead and oakum, where drain pipes are less than two inches galvanized iron (standard) pipe or lead may be used. Run all horizontal drains to a uniform grade of not less than one-half inch in ten feet, support with wrought iron hangers. Extend the iron drain pipes outside of cellar or foundation wall at least three feet before connecting with sewer pipe.

Outside drains or sewer pipes should always be of salt glazed tile of ample size, laid to a uniform grade on the solid undisturbed earth with the joints made perfectly tight with Portland cement swab and carefully clean the inside of joints to prevent clogging.

Water pipes should never be run in walls or between ceiling and floor as they are liable to leak and cause no end of trouble. Expose them in the room neatly tag and bronze or paint them and no one can find reasonable objection.

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Be careful and don't expose pipes to the cold; if you must locate them where they are liable to freeze, carefully box and pack them in mineral wood. This will save you a lot of trouble and expense during the cold snaps.—The Contract Record.

Hanging Lamps

In many a hall-way is hanging an old-time lantern that performed the same service in a hall two hundred years ago, though, to be sure, they do not now contain the oil lamp, the tallow dip, or a wax candle. On the contrary, they may be fitted out with electricity, and shine forth all the more bravely with a borrowed light, though they certainly do not look out of place in the midst of the old-fashioned furniture that plays its part in so many homes at the present day. Yet the taste for this old type of metal work is apt to be overdone. I have seen a lamp hanging in a house, clumsily made of wrought iron, which looked as though it had been made by a pre-historic blacksmith. To my friend's artistic soul, this crudity, this simplicity of design, this clumsiness of manufacture, no doubt appealed. But the lamp, though placed in the hall of a most magnificent building, was more fitted to be hung behind a barn-door.

Quaintness in hall lamps is worth while if they combine utility with beauty, and there are many beautiful specimens to be had, with this desirable combination.

Ugliness is always ugly, and the fact of it being two hundred years old should not be any better recommendation for its preservation.—Ex.

Henry E. Huntington's Country Residence

Architects Myron Hunt and Elmer Grey of Los Angeles report that work on the new country residence for Mr. H. E. Huntington, to be built on the old Shorb ranch, near South Pasadena, which he has renamed Los Robles, has been started.

The reinforced concrete comprising the skeleton construction of the building is now ready for figures. This work will be let as a separate contract, and includes the concrete roof slab carrying the tile.

The exterior walls and interior partitions will be of tile, 3, 4, 6 and 8-inch being used. The tile is arranged to surround all columns. Exterior walls are made by two tile partitions, one inside and one outside of exterior columns.

All the principal ceilings will be on metal lath, hung to metal furring.

It is not proposed to let the plumbing and the electric wiring until about January 1st. In the meantime, conduit chases, together with openings and chases for plumbing runs are provided for in the structural drawings so that no cutting away of concrete beams or concrete floors will be necessary.

Heating is to be by blower driven warmed air from a central chamber.

The exterior will be finished in plaster over the tile. The plastering contract will not be let this year.

Work on the interior finish is not far along. Except for one or two rooms in mahogany, practically the entire interior woodwork will be white enamel. The floors will be of oak, except possibly in a few halls and vestibules, where marble and mosaic will be used.

The front of the building facing the San Gabriel Valley is 150 feet wide, but the length of the building east and west, when the great east porch and the servants' quarters which are located at the northwest corner are considered, is 275 feet.

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By the Way

Some Industrial Information Worth the While

Fire Protection for Buildings

The L. E. Boyle Company, Inc., has taken the Pacific Coast agency for the Kanawha Chemical Engine Manufacturing Company and is prepared to assist architects in designing a building so that it can be equipped with a fire extinguishing plant. The cost is trifling when the added protection from fire and the consequent reduced insurance rates are taken into account. A compressed air pump installed in the basement of a building forces the chemical through a hose conveniently stationed on each floor. The capacity of the different styles of apparatus range from fifty to five hundred gallons. The company also manufactures chemical engines for fire departments and one was recently sold by Mr. Boyle to the Berkeley fire department.

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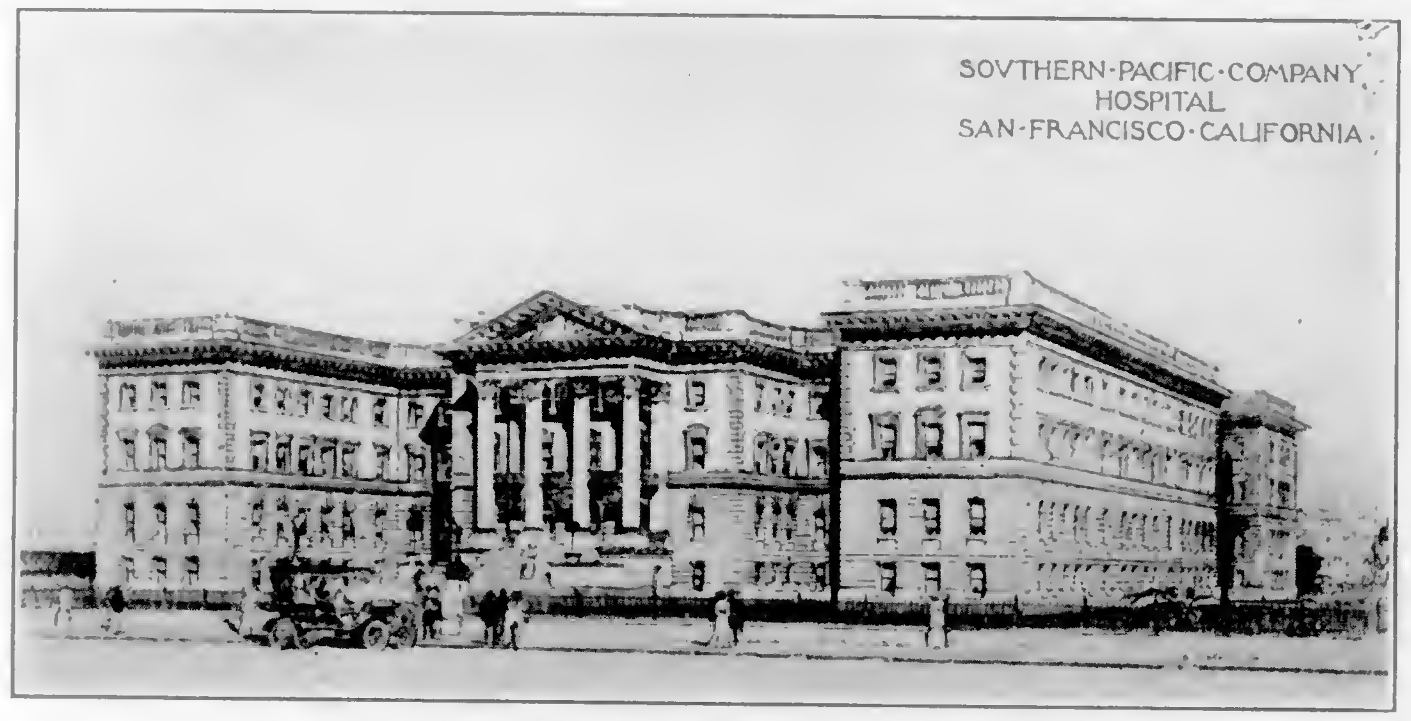

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Honor for Mr. Gester's Son

George Clark Gester, son of W. B. Gester, a well known San Francisco civil engineer and cement expert, who recently graduated from the College of Mining, University of California, has been added to the faculty of the university and began his duties as assistant in the instruction work of the College of Mining, upon the opening of the present semester last month. Young Gester made an enviable record as a student and his appointment to the faculty was made upon recommendation of President Wheeler.

Gilley-Schmid's New Auto

The Gilley-Schmid Company of San Francisco has taken delivery of the second Buick car purchased from the Howard Automobile Company. Mr. Schmid recently purchased a two-cylinder touring car, and about a month ago Mr. Gilley took delivery of a Buick White Streak. After becoming familiar with the car around the city for a day or so, Mr. Gilley started on a two weeks' tour of Marin, Sonoma and Lake counties.

Interesting Article

"A Trip to Alaska" is the title of an interesting article written by Editor Mayer, and which appeared in a recent issue of the Jewish Times, 264 Pacific building, San Francisco. The article is replete with interesting incidents and the writer's description of the northern country is quite picturesque.

Russell & Irwin Hardware

The Russell and Irwin Company will supply the hardware for the new Custom house now being completed in San Francisco. The hardware in the handsome new Postal Telegraph building, San Francisco, is also being supplied by this well known house.

An Ideal Office System

Joseph Ahlbach of the firm of Ahlbach & Mayer, San Francisco plumbers, has written an article for Domestic Engineering on the ideal office system for the successful plumber. Mr. Ahlbach gives in detail the entire operation in office work on a contract or job from the time the latter is figured until it is completed. A printed form is adopted and is used by the firm in estimating on all work ranging from $50 to $100,000, and Mr. Ahlbach says it has never failed its purpose.

Up to Date Iron Works

The Security Wire and Iron Works have recently moved into new and commodious quarters at 133 Bay street, San Francisco, and are now prepared to manufacture all kinds of ornamental iron and wire work, such as fire escapes, folding gates, trapdoors, railings, etc. Esposto Bros., the proprietors, are both enterprising and wide awake young men and with their thoroughly modern plant should have no difficulty keeping it going with first-class orders.

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Big Government Contract

The San Francisco Bridge Company was the lowest bidder for the great construction work that is to be done at Fort Mason for the army transport service. Its bid was $1,286,000. The next lowest bid was by the American Construction Company, which named $1,428,000 as its price for the work, and the third and highest bid was by the Pacific Construction Company, which named $1,447,000 as its price.

The work to be done includes the construction of the sea wall, crib wall, transport wharves and sheds. These bids were based on the plans and specifications prepared by the government.

The following bids were submitted on the plans and specifications prepared by the different bidders:

Pacific Construction Company of San Francisco, $1,147,000; C. Leonardt and L. J. Mench, 42 Market street, $1,348,000; San Francisco Bridge Company, $1,143,000, and Penn Bridge Company of Beaver Falls, Pa., $1,440,000.

Major Williamson hopes that active operations will begin by the first of October. The work had previously been let to the P. J. Carlin Construction Company of New York for $1,178,000, but this firm failed to qualify, so it was necessary to have new bids taken.

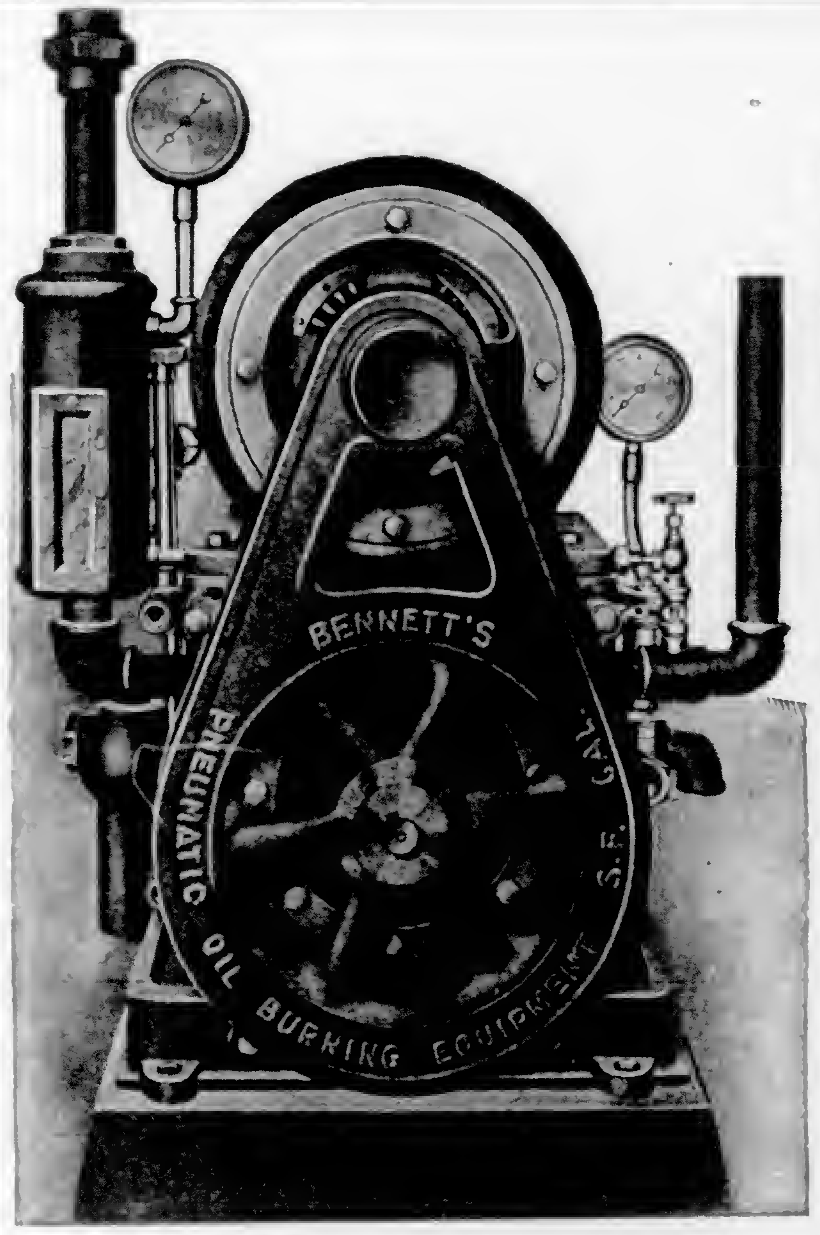
Corrugated Bars for Reinforced Concrete Construction

To meet the requirements of those who for various reasons prefer a round bar for reinforcing purposes, the Expanded Metal and Corrugated Bar Co., of the Frisco Building, St. Louis, Mo., are prepared to furnish these bars in addition to the usual corrugated squares and flats.

In order to fully illustrate these new bars and to present a record of recently constructed concrete work, where this company's reinforcements have been used, the Expanded Metal and Corrugated Bar Company have issued an illustrated pamphlet of more than one hundred pages measuring 9x11 inches.

This pamphlet illustrates examples of concrete construction from the modest country dwelling to the massive railway bridge, viaduct and spillway dam. It is a valuable book to have at hand, as it shows the possibilities of reinforced concrete as applied to the largest class of work.

An interesting feature is the space devoted to floor construction. These show spans of varying widths and the method of their reinforcement, based on the best modern practice.



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References:

Pacific States Telephone Co., Grand Hotel, Aronson Building, Robins Hotel, Williams Building, Boyd Estate, Hotel Arlington, The Empire Apartments, Hotel Leo, Marine Building, Union Square Building, Schmidt Building, Hillcrest Apartments, Duboce Apartments, Sherwood Block, San Francisco and the Imperial Hotel, San Jose.

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Splendid Fixtures For New Oakland Jail.

The Pauly Jail Building Company, through its San Francisco representative, Charles M. Finch, with offices in the St. Clair building, California and Drumm streets, is supplying all the cell fixtures for the new county jail under construction in Oakland. The equipment is the most complete ever installed in a Pacific Coast jail and includes the very latest locking devices, insuring absolute safety and permitting the operation of any or all cell doors on each floor from outside the prisoners' corridor. The best steel has been used, the material being five-ply steel, tool proof.

There are forty-eight cells and each cell is supplied with a wash stand and toilet. There is one cell in each section fitted up with a shower bath and the prisoners will be required to bathe at least once a week.

This jail is the first to be built in California under the direct supervision of the State Board of Charities and Corrections and in consequence it is considered the model jail of the West. The work of installing the fixtures is in charge of Tom Wells, who was sent to the Coast from the factory in the East. Wells is an expert in his line and has superintended the building of some of the largest prisons in the United States.

Mr. Finch recently finished fitting up the court house at Goldfield, Nev., with steel fixtures, every piece of furniture in the building with the exception of chairs being made of metal. These were manufactured by the Canton Art Metal Company, of which Mr. Finch is also the San Francisco representative.

New Brick Industry

Work is being pushed rapidly by the Pyrmont Brick Company in the erection of their plant at Lincoln, Placer county, Cal., for the making of the highest class building brick. The company controls some 240 acres, part of which lies within the city limits. Wells have been drilled at small intervals revealing throughout the entire area, the high grade clay necessary to the making of the best bricks.

Arrangements have been made for the burning of two million of bricks by the method of field kilns, and about half of this number of bricks will be used in the construction of the company's buildings. This is being done in order to demonstrate the feasibility of the proposition.

A brick-making machine has been installed, one that will turn out an average of 30,000 bricks per day. Poles already have been set for the electric power lines which will run the machine.

Four buildings will be erected as soon as the necessary number of bricks are made and burned. The plans for these are drawn and their site surveyed. The switch from the main line of the Southern Pacific will enter the grounds near the location of these buildings. An oil tank has been placed to supply the fuel for the burning of the kilns.

The company's main offices are in the Bacon Block, Oakland.

Narrow Escape for Tunnel Builder

Charles E. Higbee, said to be the greatest tunnel builder in the world, was almost instantly killed recently by the breaking of a derrick at Shoshone, twelve miles east of Colorado Springs, Colo. He is said to have constructed forty-nine of the world's largest tunnels, among them the Simplon.

PHOTOGRAPH OF WINDOW MADE BY
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The following are a few of the elevators installed in the southern part of California by the Llewellyn Iron Works of Los Angeles, California, who are the manufacturers of the several types of electric and hydraulic elevators which the Western Elevator Company, 801-802 Humboldt Bank building, San Francisco, California, are now offering to the trade.

According to the manufacturers, these goods are no experiment; they have been tried and found entirely satisfactory in every respect, and are equal to the best in the market, and in many respects superior. The list:

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Death of Landscape Architect

The death of George Cook, a well-known landscape architect, occurred recently at the Willows, a summer resort in the mountains near Alpine. Cook was chief engineer for the San Diego city and county boulevard commission. He was driving through the country, viewing roads, when an accident to the harness resulted in dropping the wagon pole and frightening the horses.

Cook was thrown out of the wagon and fell down the side of the road, a distance of about 50 feet, breaking five ribs and dislocating a shoulder.

He was a partner of Samuel B. Parsons of New York, the authority on landscape culture, and with him came to California to plan improvements.

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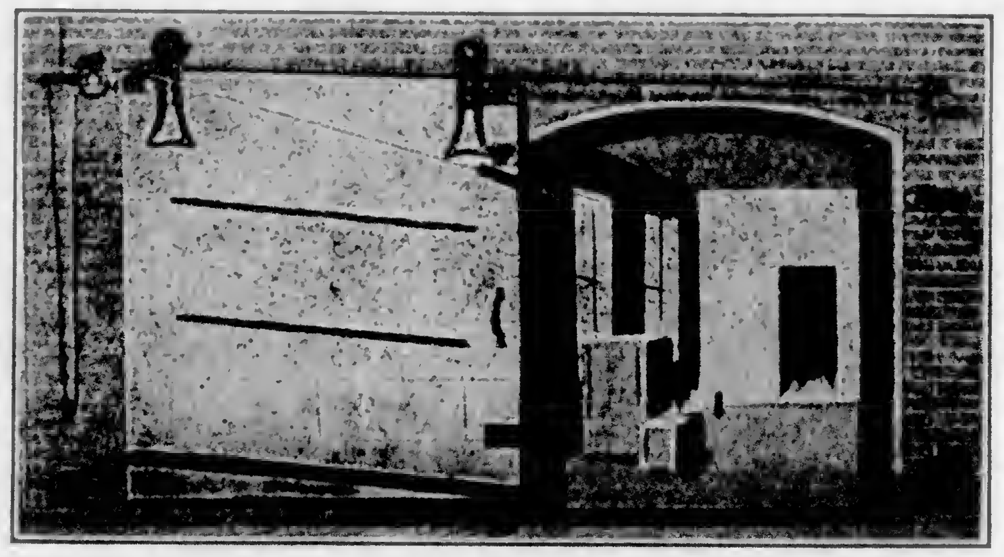

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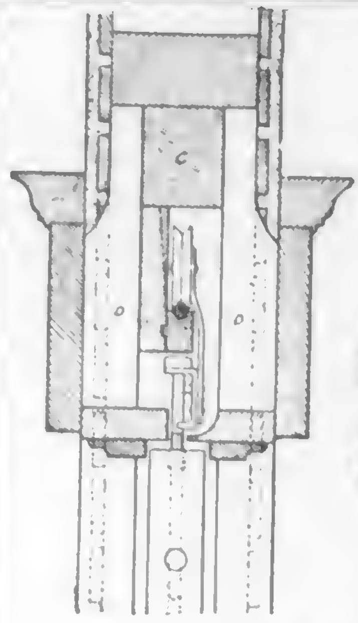

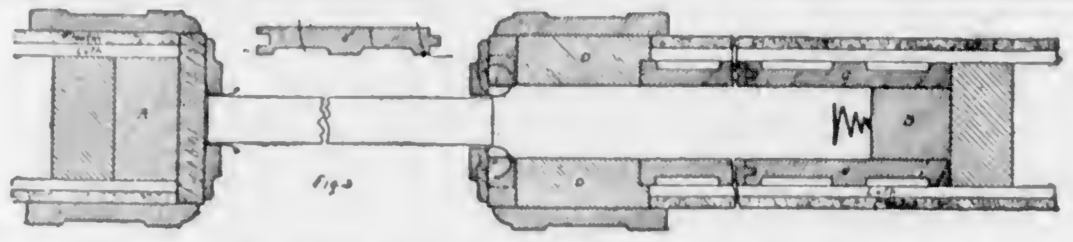

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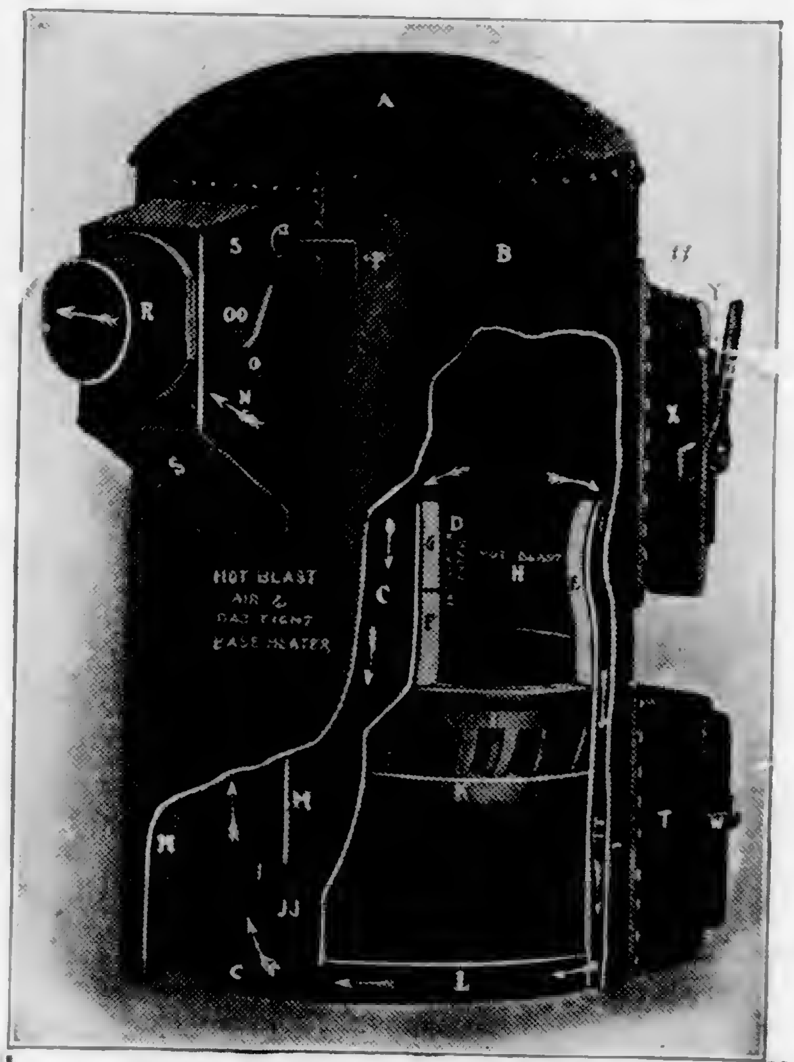

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The device here presented is one suitable for a single bath room in a house or flat and will furnish at once the hot water required, the expense of production ceasing the moment the flow of water ceases. Experiment with the device shows, it is claimed, that the cost where one dollar gas is to be had is only two cents for a bath tub full. The only effort called for is to turn on and light the gas, and in turning off the water the gas also is turned off. The smallest quantity of hot water is supplied with the same facility as larger quantities.

These heaters are smal, compact, made of copper, nickel-plated and highly polished, so are both durable and at the same time ornamental to any bath room. They can be placed on the wall over the bath tub where their presence would never be noticed, except for its becoming the location of the most prized convenience whenever one of these heaters is in use.

As these heaters have become known they have grown in popularity and are said to have met with a larger sale than all other hot water gas heaters combined. Their unsurpassed excellence in service and fine construction accounts for this. They have a simple but very effective gas locking device, which prevents explosion; a regulator to adjust the supply and temperature of the water; a white porcelain enameled shelf that is absolutely rust proof; a removable base plate for burner inspection and cleaning and a cast iron burner, so arranged that perfect combustion and the greatest possible heat are assured.

The device is made by the Humphrey Company, Kalamazoo, Mich., who also make a larger heater, which they term "Instantaneous Automatic Thermal Gas Water Heater."

San Mateo Elks to Build

San Mateo lodge of Elks has formally taken over the property adjacent to the postoffice, the consideration being $10,000. Architects Havens & Toepke have completed the plans for the building, which will be a two-story structure of reinforced concrete. It is understood that the work of construction will be started without delay.

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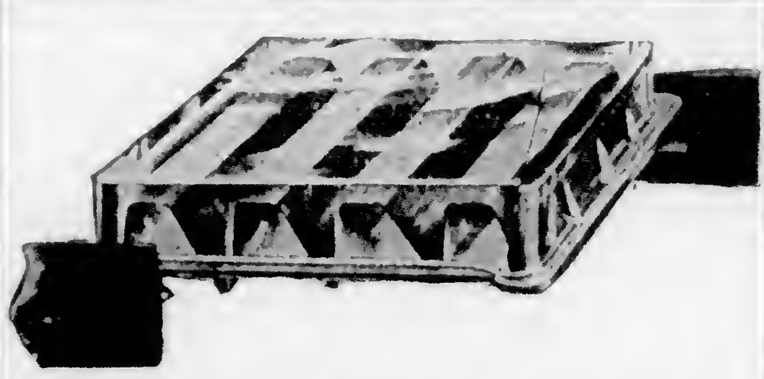

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Build Fireproof Structures

From the Architectural Review.

The architect, occupying the position that he does—or should—as adviser to his client, has it well within his right to exercise a great power toward the solution of two very important problems that are just at present coming much before the public eye. The first of these subjects is the rapid disappearance of timber as a building material through the rapidly increasing deforestation of the country, both east and west. The other is the gradual recognition that the people of the country are giving to the terrific loss of property and injury to local development occasioned, year after year, by the destructive element of fire.

The architect can best serve his client and the correction of these two evils at the one and the same time by advocating—where opportunity may serve—the erection of fireproof structures—even of fireproof dwellings. The slight additional cost estimated as an offset against insurance premiums and the expense of yearly maintenance and repairs make the problem—even now—one of peculiar appeal to the American man of business, from its commercial side alone. It is perhaps—though the factor has not yet been recognized by the untechnical and general press—almost alone the great prevalence of wood in America as a residence-building material that makes the annual consumption of wood per annum per individual in Europe appear to absurdly small compared to the per capita consumption of this country (We use between six and seven times more timber per head of our population than is the recorded consumption for Europe!)

The use of stone, brick, concrete, or terra cotta for walls and partitions saves enormously in the bulk of the wood required for an individual dwelling. The substitution of terra cotta or concrete for floors is another important item of saving; where, too, the simpler fireproof floor construction can be put in at an actual less expense than can the old-fashioned wood floor-joists: while by appreciating the advantage of simplicity in interior finish, and adopting a modern and continental point of view in regard to its utilization and detail, the architect can himself simplify the care and increase the life and attractiveness of the interior of the American dwelling, while aiding still further the saving and conservation of our fast disappearing forests.

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Making Glazed Brick

The Carnegie Brick and Pottery Company is operating its plant constantly but is limiting the output to actual requirements. Glazed brick is in fair demand and the many beautiful buildings that have been decorated with this article has caused builders to look upon its use in a more favorable light than formerly. First class glazed bricks are bringing about $80 per M and this price is being firmly held, there being a disposition on the part of the owners of these plants turning out this article to have no surplus on hand.

Rebuilding the Quebec Bridge

The Canadian government, says the Iron Age, will assume all the assets and franchises of the Quebec Railway and Bridge Company under a resolution which will be introduced at Ottawa, and the reconstruction of the Quebec bridge will be undertaken as a government project, under the supervision of the Trans-Continental Railway Commission. The oversight of the construction work will be in the hands of a board of prominent engineers, one from Canada, one from the United States, and the third from Great Britain. It is stated that the Canadian government will assume the loss of all expenditures made by the Quebec Bridge Company under the bond issue guaranteed by the government up to the collapse of the bridge, the amount being between $5,000,000 and $6,000,000.

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New School Buildings

City Architect Newton J. Tharp of San Francisco has commenced work on the plans for fifteen new school buildings to be erected in the city and county of San Francisco. As soon as the plans are out from the City Architect's office bids will be taken and figured upon and work will be rapidly pushed.

The money for the construction of the schools is part of the last bond issue.

Several buildings will be Class "A" while the others will be what is called a "Special Construction." These special construction buildings will be frame, Class "C" finish, while the interior will be fireproof. All buildings will have large stairways and out-swinging doors and fire escapes that will be an aid in case of fire instead of receptacle for the cremation of human beings.

The following is a list of the schools to be built:

The Commercial High will be a Class "A" building, not less than twenty class rooms, to be built on a site acquired by the city on the north side of Grove street between Larkin and Polk streets, to cost $190,000.

It will be a four-story and basement building, and is to be up-to-date in every detail, will have commodious teachers' rooms and offices and utility rooms.

The Denman Grammar will be a Class "A," sixteen-room building on the north side of Page, between Steiner and Pierce streets, to cost about $160,000. It will be erected on a site acquired by the city.

The Hancock Grammar will contain sixteen class rooms, and will be erected on the present site on Filbert street near Jones, at a cost of $100,000.

The Jean Parker Grammar will be a Class "A" building of sixteen rooms, to be erected on the present site on Broadway, between Powell and Mason streets, at a cost of $160,000.

The Jackson Primary will be of the "Special Construction" type and will contain sixteen class rooms, to be erected on an acquired site north of the Panhandle between Stanyan and Baker, at a cost of $100,000.

The Bryant Cosmopolitan Primary School will be of "Special Construction" and a sixteen-class room building, to be erected on York street, between Twenty-second and Twenty-third streets, at a cost of $100,000.

The Sheridan Primary School will be of "Special Construction" type and a sixteen-class room building, to be built on the present site on Minerva street near Plymouth avenue, at a cost of $100,000.

The Mission Grammar will be "Special Construction" and a sixteen-class room building, to be built on Mission street, between Fifteenth and Sixteenth streets, on the present site, at a cost of $160,000.

The Holly Park Primary will be of "Special Construction" and a sixteen-class room building, to be erected on a site to be acquired on Holly Park avenue, between Highland avenue and West Park, at a cost of $100,000.

The Sutro Grammar will be of "Special Construction" and contain sixteen class rooms, to be erected on the present site on Twelfth avenue, between Clement and California streets, at a cost of $100,000.

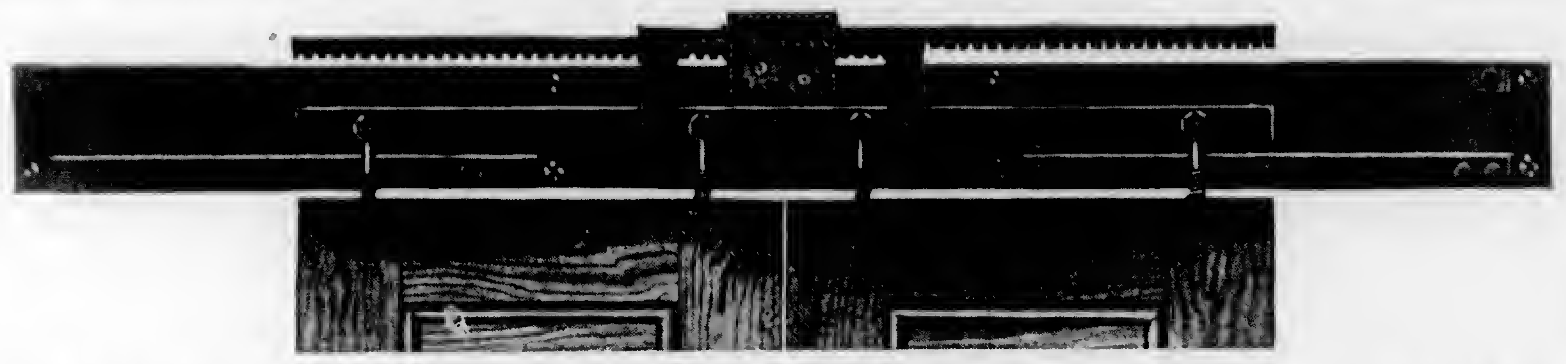
The South End Primary School will be "Special Construction" of sixteen class rooms to be built on the present site between Berlin and Girard streets at a cost of $100,000.

The F. J. McCoppin Primary School of sixteen rooms, a "Special Construction" to be built on the present site on Sixth avenue, between "B" and "C" streets, at a cost of $100,000.

The Marshall Primary will be of "Special Construction" to contain sixteen class rooms and will be erected on an acquired site on Nineteenth street, between Valencia and Guerrero streets, at a cost of $100,000.

The Adams Grammar will be Class "A" building of twelve class rooms, to be erected on the present site on the north side of Eddy street, between Van Ness avenue and Polk streets, at a cost of $120,000.

The total cost of the "Special Construction" buildings will be $1,685,000.



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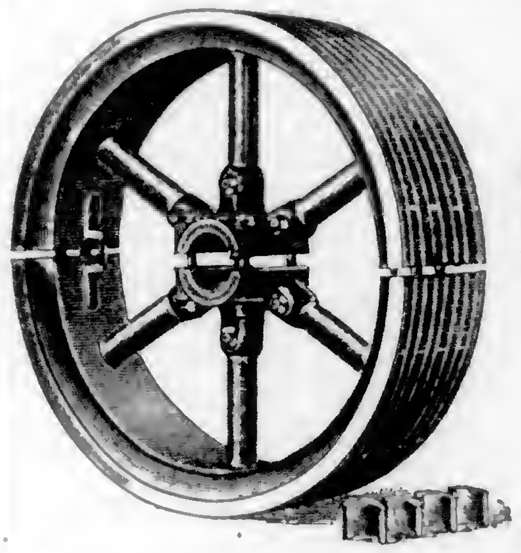

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Golden Gate Brick Company

C. F. Pratt, manager of the Golden Gate Brick Company, states that his firm was fortunate enough to have a large number of contracts on hand for the summer months and that the plant has not been closed for a day even during the present season. This firm has been making a specialty of going after the country business and a number of very satisfactory contracts have been secured in the interior towns. The latest of these is for the brick to be used in the construction of the new high school building at Tulare, Cal. Mr. Pratt states that there is a good demand for brick for mantel work in dwelling houses around the bay and that there has been a steady call for brick for this kind of work.

The Reliance Company has just published its 1908 catalogue which is a very tasty affair and contains a list of all the agents of the company in the United States. Some fine half-tone illustrations of the hanger are shown together with the price list of each size hanger. A copy of the catalogue will be mailed to any reader of this magazine upon request to any of the Pacific Coast agents.

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Architects' Chapter Meeting

The meeting and dinner of the Southern California Chapter A. I. A., on September 8, was one of the most interesting and largely attended gatherings that has been held by the Chapter for some time.

After the regular order of business had been disposed of the members listened to an address on the origin and progress of architecture by Secretary Fernand Parmentier. The paper dealt with every phase and style of architecture from the most remote and primitive times down to the present day. It expressed a great amount of thought and study on the part of the author, and he was accorded a rousing vote of thanks by those present at the close of his address.

A number of other matters of importance relative to proposed amendments to the building ordinances, schedule of compensation, etc., brought out considerable discussion. Among those present was J. N. Preston, a former active member of the profession, who now resides at San Gabriel.

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Japanese Oak for Interior Finish

White Bros., the well known San Francisco dealers in hardwood, are carrying in stock a considerable quantity of Japanese oak for interior hardwood finish. The wood is brought here in log and is sawed at the company's planing mill in Petaluma. This wood is especially nice for dining room finish and may be used also for furniture. White Bros. are also carrying Borneo camphor wood, which many architects specify for closets where the owner is desirous of having something that is proof against moths and other insects. Camphor wood is being quite extensively used now for drawers, chests, shelves, etc.

A Fireproof Flooring

The Demolith Company, manufacturers of a composition sanitary and fireproof flooring, has been reorganized with the following officers: President, H. M. De Motte; treasurer, L. D. Byrne; secretary and manager, J. A. Byrne. The company's office is at 417 Montgomery street, and the show rooms and factory are at 310 Clementina street, near Fourth, San Francisco. Demolith is a composition flooring composed largely of magnisite and is especially suited for hospitals, lavatories, hallways, kitchens, outside porches, etc. It is less expensive than tiling or terrazo and is softer to the tread than plain cement. It can be made in any color. A very creditable job recently finished by the company is the flooring in the new County Hospital in San Jose, Wolfe and McKenzie, architects.

New Prison Building

A new prison building, four stories high and containing 800 cells, is to be erected at San Quentin penitentiary. Plans for the building have been completed by State Architect Sellon, of San Francisco.

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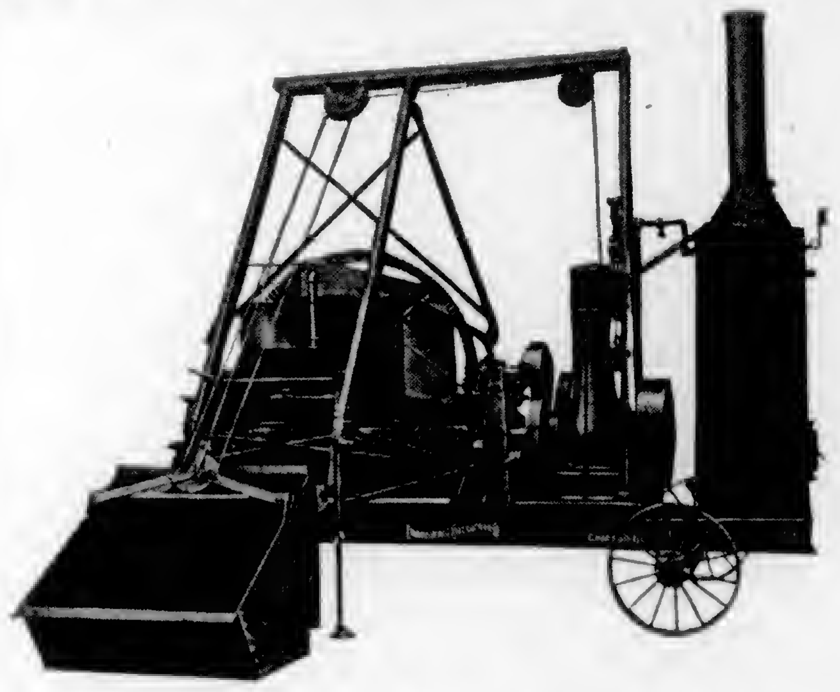

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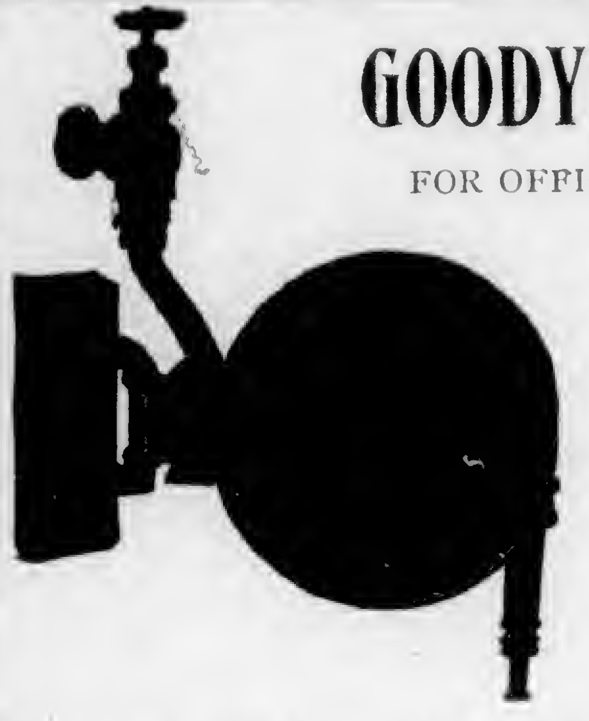

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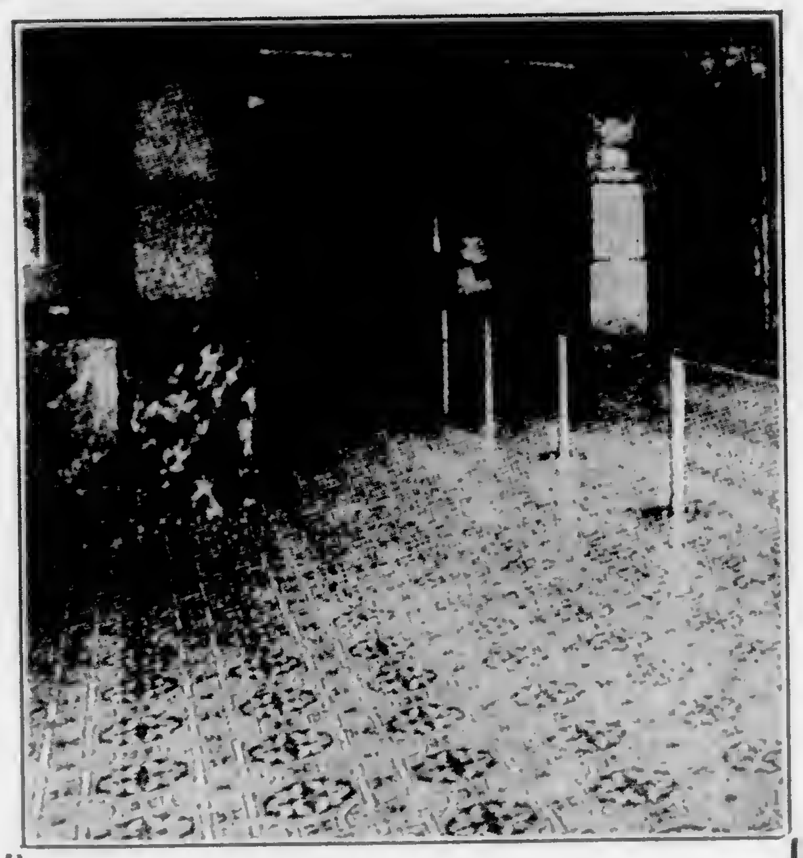

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Fashions in Brick

"Nothing is more common or prosaic than bricks, which have served utilitarian ends for untold centuries, and anything like a fashion in them one would scarcely expect to find, yet such is the case. Twenty years ago, and even more recently, the finest fronts were constructed of red pressed brick, carefully gauged to size and shaded to one even color. These were laid in running bond with the narrowest possible mortar joint. This was usually of a red color to match the brick, the effect produced being a surface so uniform as to produce the appearance of a pointed and ruled wall.

"The discovery some years ago of clays that would burn brown, old gold, buff, gray and other light colors and the rapid and satisfactory development of a great industry engaged in manufacturing brick of this character, brought them into wide use. One color has succeeded another in popularity until now the prospective builder has a wide range of color to select from, almost every shade being at his command, even green and blue being obtained by the use of glazed or semi-glazed surfaces.

"With the departure from the even red color came rapid development in the matter of the thickness, color and texture of the mortar joint, and in the style of bonding the face brick to the backing-up wall, so that the construction of a brick facade today is a highly artistic proposition, capable of the best results only in the hands of a skilled architect.

"Many owners and builders still adhere to the old pointed effect, but these may be said not to have a realizing sense of the beauty of artistic brickwork. This is particularly true of the speculative operator, but even here a change may be noted, and this will doubtless spread until brick of artistic color are generally employed even in this class of construction. The architects of the country have come to realize as a class, what the best of them knew long ago, that to be interesting, to say nothing of being attractive, a brick wall must have 'life' and 'texture,' and that this can best be secured by the use of brick that vary considerably in color. It has further come to be understood that they must be laid with a wide mortar joint and preferably with header brick, forming a true bond into the main wall, the whole being a frank expression of true brickwork.

"This change of fashion is one of the strongest proofs that brick will continue in favor as a building material, concrete and other valuable available substitutes notwithstanding. Red brick, however, are still preferred for the stately conservative mansions, where dignity and elegance are desired."—The American Contractor.

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Pacific Coast States

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REID BROS ARCH'S

The Hewes Building, San Francisco
Reid Bros., Architects

Frontispiece, The Architect and Engineer of California
October, 1908

THE
Architect and Engineer
Of California
Pacific Coast States

VOL. XIV. OCTOBER, 1908. No. 3.

The California State Law Regulating the Practice of Architecture

By LIONEL DEANE, Architect.*

EDITOR'S NOTE.—*The District Attorney of Alameda County recently refused to prosecute an Oakland architect who was advertising himself as a fully licensed member of the profession when, as a matter of fact, he held no State certificate. The position held by the District Attorney is that the State law regulating the practice of architecture is defective. The law, unfortunately, permits an architect to advertise himself as such, provided he notifies his clients before entering into business relations with them, that he is not a registered member of the profession, and that, as a matter of fact, the public display of his name was a falsehood. But does he do this? The evidence gathered by the California State Board of Architecture has, in the major portion of cases, borne out the truth of the assumption that he does not do so. The law is unquestionably weak and should be revised and amended so that the profession shall receive the proper kind of protection. In the article which follows, Secretary Lionel Deane gives an interesting history of the law, from its inception, and calls attention to the strong as well as the weak points, and suggests some possible remedies which are, indeed splendid food for thought.*

REGULATION of the practice of architecture in America had its inception in the middle of the nineteenth century, when men of training were first brought in contact with the so-called "practical" man, and the legislatures of various states were importuned from time to time, to place safeguards around the art of building. In most cases looking to the safety of the public rather than to the aesthetic requirements of the "Master Builder."

For various reasons these acts failed to mature—largely, however, to the cupidity of firms and corporations who saw that their incomes would diminish if necessary restrictions looking to the public interests were made to prevail. They naturally preferred the "Buddenseik" methods of the past and which are still prevalent in states where some form of examination for the determination of ability does not exist.

Municipal Building Laws have been found, in many cases, to be simply a source of profit to political employees, while in others, where the persons authorized to see that the provisions of the local act are carried out are honest, they frequently have not had the previous training to fit them to discriminate and many grave errors have been unwittingly perpetrated. So frequent were these and so difficult to place the blame and often the monetary loss that accrued therefrom, each party blaming the other, that finally in the Middle West the building trades arose en masse and determined that they would at least partly remedy the cause by the insistence of competence at least, on the part of the architect.

In the past, any man glib with his tongue and facile with his pencil who may have made a failure at every known trade or profession could hang out

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*Mr. Deane is secretary of the Northern District, California State Board of Architecture.

The Hewes Building, San Francisco
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In the past, any man glib with his tongue and facile with his pencil who may have made a failure at every known trade or profession could hang out his shingle and dub himself Architect. And strange as it may seem, conservative individuals who in their daily walks of life were pointed to as models of shrewdness would intrust these persons with the handling of large sums of money and place in their hands operations which involved the safety of a large number of people. An accident was either attributed to the Act of God or the carelessness of the workman.

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*Mr. Deane is secretary of the Northern District, California State Board of Architecture.

The Building Trades of Chicago and the state of Illinois therefore had enacted a law, requiring all persons desirous of practicing architecture in that state, to pass an examination before an impartial board, to determine their fitness so to do. It at first met with some opposition from members of the architectural profession itself. Men who were conscious of their own ability felt that it was a restriction on their personal liberty, but gradually the great good accomplished as the years rolled by, has turned the most active opponents to the most vigorous advocates, and it came to be that young men from other states frequently took the Illinois examination, proudly exhibiting their certificates as one would that of a post-graduate degree in a university.

It must always be borne in mind that an act to regulate any profession is not in the interest of the profession regulated, but, as has been tersely stated in the "Report of Committee on Registration of Architects," made to the Convention of the American Institute of Architects at Chicago, Ill., in December, 1907, "An architect's license law must necessarily be enacted under the police powers given to the legislatures of the several states by their constitutions, to regulate the acts of incompetent persons or even prevent incompetent persons from performing acts which might result in danger to the community. It is very clear that such laws should be enacted rather on the demand of those who need such protection than of those who are to be regulated by it. * * * No law which regulates the practice of architecture in the interests of architects should be or ever will be enacted. It is the people only who should be interested in their enactment."

The original bill for the act which was brought before the California legislature in the year 1900, contained all the essentials of the Illinois act and such additions as wisdom and experience suggested. This act was drawn up by excellent legal talent, after extensive correspondence with the Illinois Board and consultation with architects and persons engaged in the building trades and interests. The people of the state of California, through their legislators amended the same, however, into the shape approved March 23, 1901. This, however, was again amended on March 26, 1903, since which date, although several amendments to the act have been introduced to the legislature, all have failed to pass.

Reviewing the history of the operation of the act in California, what strikes me strongest is the moral effect of the law. The large number of trained practitioners who have entered into practice in this state since the act went into effect in 1901, each and every one earning his spurs, has been a result of which the advocates of the law may justly be proud; fully one-half of the active practitioners in the state having come in under an examination.

I found in a recent trip throughout the United States that several Technical Schools and Universities were paying special attention to preparing possible candidates for examinations and that California practitioners were regarded with great respect: and this must necessarily be, as the incentive of a certificate prompts many of the younger aspirants for professional distinction to burn the midnight oil, where under other conditions they would use the time for pleasure. Many cases exist where the applicant failed on the first, second, and even the third, examination and ultimately triumphed even with honors. Many complaints and ridiculous charges have been made by unsuccessful candidates and their friends, and many persons have (knowing their own incompetency) ignored the Board and its operations, and blatantly held out against the abridgment of personal liberty. I cannot answer them better than by paraphrasing an editorial of the Oakland Tribune in relation to the Dental Law.

"Every man arrested for practicing architecture in violation of the law complains of being persecuted and charges the agents of the State Board of Architecture with improper motives and practices. Both the law and the Board of Examiners are assailed as unjust and a wicked interference with the rights of citizens.

"No one should be deceived by this sort of clamor. If the irregular practitioners were competent to practice the profession of architecture they would undergo the necessary examination and take out a license as the law directs. By doing so they would prove to the world that they were fully qualified and officially approved, and be free from arrest, expense and annoyance. The annual license fee is small—a mere trifle. That they prefer arrest, the harassment and unpleasant notoriety of police court trials and the expense of hiring lawyers is proof that they cannot pass an examination and are not properly qualified to do the work they are engaged in and for which they exact fees from clients.

"The cry of persecution is a fraud and a pretense. It masks a plea to be permitted to impose on the public and get money under false representations.

"The law requiring architects to undergo an official examination touching their competency, take out a license and be registered was enacted to protect the public from imposition and charlatanry. It is a wise law. The architectural laws were passed to protect the people from injury and financial imposition. They provide that no person shall be permitted to practice architecture without proving himself qualified and taking out an official certificate of his compentency. When an architect fails to fulfill the requirements of the law he confesses his inability to pass the prescribed examination and also admits his ignorance and inferiority. His howl about persecution is the humbug of a charlatan, the last resort of a trickster."

The constitutionality of the act was determined by the Supreme Court of California in bank on May 22, 1907, and in that decision it is pointed out the remedy for any arbitrary or unreasonable application of authority by the Board. I will quote therefrom:

"Nor is the objection of petitioner that, by the provision authorizing the board to adopt rules and regulations for the examination of applicants, discretionary and arbitrary power is conferred upon the board under which discriminating, unreasonable, and unfair rules and regulations may be established. No arbitrary power is conferred on the board in this respect. The authority conferred by the statute is to pass necessary and proper rules on the subject: rules which must be reasonably adapted for the purpose of determining the qualifications of *all* applicants to practice the profession of architecture from an examination of the applicant on subjects pertaining to that profession. There is always implied in a grant of authority, such as here conferred, that it shall be exercised reasonably and fairly, so as to effectuate the end contemplated. If they should adopt rules which are not uniform, or which are discriminating and unreasonable, that could not effect the validity of the act; it would simply be a violation of its provisions. The remedy of the petitioner, if the board violates its duty in this respect, is to apply to the court under some proper and appropriate proceeding for relief. * * * Such requirements may be left to the sound discretion of the commission or board, which will be accountable in the courts for any abuse or unjust exercise of the discretion with which it is vested. A familiar instance of this is found in the law touching the admission of attorneys to practice before the courts of this state. The Code of Civil Procedure declares that every applicant for admission of an attorney and counselor must have the qualifications of learning, ability, and character, and must produce satisfactory testimonials of good moral character, and must undergo a strict examination as to his qualifications. A vast majority of the practicing lawyers of this state have been admitted after such an examination. It would come with some shock of surprise to these members of the learned profession to be told that their licenses were void because the Legislature had failed to define the qualifications which they may possess."

Architecture is many sided and surely no individual who is simply good in one can complain if after being found defective in other, and more important to the public, branches, the board refuses him a certificate to practice architecture. He must not only be grounded in the aesthetic, but also the practical side of the profession. The law as it at present stands reads as follows: "provided, that nothing in this act shall prevent any person from making plans for his own buildings, nor furnishing plans or other data for buildings for other persons, provided the person so furnishing such plans or data shall *fully* inform the person for whom such plans or data are furnished that he, the person furnishing such plans, is not a certificate architect." The Supreme Court decision on that point reads as follows: "The further provision of the statute that an uncertificated architect might practice architecture to the extent stated therein, provided he informs his employer that he has no certificate, was equally in the public interest, because the employer is thereby placed on his guard as to whether he will employ an architect who had not obtained the certificate, which, *if his skill and knowledge warranted,* he could have obtained from the State Board."

The question always arises: Does he "fully" inform the person? Is it "fully informing his client when he publicly announces himself an architect, without any qualifying words accompanying it, in the daily press, magazines, programs, business cards, on his office doors and windows, etc., in a state where there is an act of the Legislature regulating and defining the architectural profession?

Would it be reasonable to suppose that such a person, seeing a fee in prospect, would, before he enters into business relations with the prospective client, throw cold water on the whole proposition by declaring in "camera" that the public display was a falsehood, until he was compelled to admit it?

The evidence gathered by the California State Board of Architecture has in the major portion of cases, borne out the truth of the assumption that he does not do so.

Acting on the experience gained in the past the board determined to strike at the root of the evil and on November 25, 1906, a special meeting was held at Santa Barbara for the purpose of framing an amendment to Section 5 of the act, which has caused much confusion and hampered the board in its work. The proposed amendment consisted in omitting the following lines of said Section: "nor furnishing plans or other data for buildings for other persons, provided the person so furnishing such plans or data shall fully inform the person for whom such plans or data are furnished, that he, the person furnishing such plans, is not a certificated architect." This was referred to the Committee of Judiciary as Assembly Bill No. 453 and was actively opposed by Jerry-builders, mill men, and others. One person from San Francisco interested therein, making a sycophantic plea for the "chicken coops and fences;" that it would be impossible for the "humble carpenter" to erect, etc. I will quote a part of his speech as reported in the daily press. He urged that "it would work a great hardship among mechanics of moderate means." He said, "there are many men, not only carpenters, who build sheds and outbuildings, sometimes homes for their friends during their spare time, etc." Then he went on with a lot of twaddle about the formation of an architectural trust, and the Legislature overlooked the fact that the act is primarily in the interest of the people, not of the profession.

When a cancer exists, a skillful surgeon endeavors to eradicate it, and it seems proper to me, to strike at the root, not to fool with the surface. Common sense is the basis of equity and the cherished "chicken coops and wood sheds" would be safe under any law that the people of California might enact. Another point that may, and doubtless will, in time be brought forth is to remove the enforcement of the act from the law to the Equity courts. The exact method I am not prepared at present of advance, but there is a certain reluctance, on the part of the citizens making a complaint, to the present method of procedure.

To sum up, even with our present imperfect law, during the period that we have been working under the act, great advancement has been made in the State of California in good practical design, the use of good materials and good construction, and much of it is due to the safeguards to good Architecture that the Act provides.*

* * *

Millions Lost by Unionism

Because the labor unions won't let a skilled workman teach his trade to his own son is the reason the United States lost the $50,000,000 contract for ships for the Brazilian navy, says Rear-Admiral George W. Melville in Leslie's Weekly. We have the best steel and iron in the world right here. We have the timber which England must import, but because the labor unions have put their restriction on the number of apprentices, skilled labor has become so scarce in the United States that it costs 40 per cent more to build a ship in America than it does in Great Britain or Germany. One apprentice to every four skilled workmen is what the labor unions are pleased to allow in the shipbuilding trades. In some trades they do not allow any apprentices unless the latter pay a large sum to the trade unions. Is it surprising that the ranks of American workmen have become depleted? To this pernicious practice of limiting and restricting apprenticeship I attribute the loss of this great contract. During this period of financial depression a $50,000,000 contract would have been a great boon to the American mechanics.

---

* Since the above article was written the following opinion was received from the Attorney General of the State of California:

San Francisco, October 10, 1908.

Lionel Deane, Esq., Secretary State Board of Architecture, N. D.

Dear Sir:—Your favor of recent date received. Therein you state:

"The California State Board of Architecture desires to obtain your opinion on the following case: Mr. Blank advertises his business as 'Architect,' NOT 'uncertificated,' by cards, by advertisements in the daily papers, and by his name on the window, thus deceiving the public.

"In your opinion, is he amenable to the 'Act to Regulate the Practice of Architecture in the State of California'?"

In my opinion the person to whom you refer is DIRECTLY VIOLATING the provisions of Section 5 of an Act to regulate the practice of Architecture in the State of California, which reads as follows:

"After the expiration of six months from the passage of this Act, it shall be unlawful, and it shall be a misdemeanor, punishable by fine of not less than fifty dollars nor more than five hundred dollars, for any person to practice architecture without a certificate in this State, OR TO ADVERTISE, OR PUT OUT ANY SIGN OR CARD, OR OTHER DEVICE WHICH MIGHT INDICATE TO THE PUBLIC THAT HE WAS AN ARCHITECT." Stats. 1901, P. 641.

Very truly yours,
(Signed) U. S. WEBB, Attorney General,
By R. C. Van Fleet, Deputy.

Shrinkage of Wood When Dried

INTERESTING experiments on the shrinkage of wood due to the loss of moisture have recently been completed by the Forest Service at its timber testing station at Yale University. These experiments show that green wood does not shrink at all in drying until the amount of moisture in it has been reduced to about one-third of the dry weight of the wood. From this point on to the absolutely dry condition, the shrinkage in the area of cross-section of the wood is directly proportional to the amount of moisture removed.

Shrinkage of wood in a direction parallel to the grain is very small; so small in comparison with the shrinkage at right angles to the grain, that in computing the total shrinkage in volume, the longitudinal shrinkage may be neglected entirely.

The volumetric shrinkage varies with different woods, being about 26 per cent of the dry volume for the species of eucalyptus known as blue gum, and only about 7 per cent for red cedar. For hickory, the shrinkage is about 20 per cent of the dry volume, and for longleaf pine about 15 per cent.

In the usual air dry condition, from 12 to 15 per cent of moisture still remain in the wood, so that the shrinkage from the green condition to the air dry condition is only a trifle over half of that from the green to the absolutely dry state.

* * *

A Vision

I see a vision of the future opening before me; I see triumph in art and achievements in science not dreamed of by the artisans and philosophers of the past. I see the sun darkened by clouds of men and women flying in the air. I see throngs of passengers entering pneumatic tubes in New York and emerging in San Francisco two hours before they started. I see the gloved and umbrellaed leaders of the Populist party sitting in their horseless carriages, singing their harvest songs, while self-adjusting, automatic binders sweep through the fields, cutting and binding and shocking the golden grain.

I see swarms of paupers, dukes and counts kissing American millionaire girls across the ocean through the kissiphone. I see the women marching in bloomers to the ballot box, and the men at home singing lullabys to the squalling children. I see every Republican in America drawing a pension, and every Democrat holding an office—and every "culled pusson riding on a free pass." And I see every laboring man drawing double pay for eight hours a day in conducting the proprietor's business the right way. And then I think the millenium will be near at hand.—Author Unknown.

* * *

Every Day Will Be Sunday

The following newspaper story, now going the rounds, purports to come from Chicago Heights, Ill.:

"The love affairs of the Day and Sunday families, who live near Chicago Heights, keep gossips busy. There are five sons in the Sunday family and five daughters in the Day family. Three of the Sunday boys have already married Day girls. The two remaining boys are courting the two remaining Day girls, and the probability is that every Day will be Sunday by and by."

Factory of the American Biscuit Company, San Francisco

Ralph Warner Hart, Architect — Equipped with Otis Elevators

A Reinforced Concrete Factory Building

By RALPH WARNER HART, Architect.

ONE of the largest factory buildings as well as one of the most complete factory power plants, constructed in San Francisco since the fire of 1906 is that of the American Biscuit Company, at Broadway, Battery and Vallejo streets. The building is five stories and basement and fronts 275 feet on Battery street and 137½ feet on Broadway and Vallejo street, covering one-half of the city block on which it stands. The five floors and basement have a combined area of a little more than four acres.

The building is constructed entirely of reinforced concrete and the foundations rest in the solid rock of Telegraph Hill. The rock excavated for the basement was crushed on the premises and used in the construction of the building. The reinforcement for beams and floor slabs is twisted steel rods, and of the columns, round rods wound with heavy wire.

Four electric freight elevators are installed in this building and there are four reinforced concrete stairways. Elevator shafts and stairways are enclosed with six-inch thick walls of reinforced concrete and equipped with fire doors.

Electric wiring, both for lighting and power, is run in steel conduit buried in the concrete of the floor slabs. No conduit was permitted to be placed in the columns and no other pipes of any kind were buried in the concrete.

Toilets for both men and women are located on each floor and all piping has screwed connections. No cast iron pipe was used. All fixtures are enameled iron.

All window frames and skylights are of sheet metal set with wire glass, and in all particulars the building is equipped to prevent and extinguish fires. A complete sprinkler system is installed throughout the building

Palace Hotel, San Francisco

Baxter California Black Marble used in this Building

Livingston & Trowbridge, Architects

and stand pipes with siamese connections in all stairways, also hose reels connected with main risers of sprinkler system. A unique feature of the sprinkler system is the reinforced concrete tower and gravity tank above the roof. The gravity tank has a capacity of 24,000 gallons and the two pressure tanks located under same have a capacity of 10,000 gallons, insuring a prompt and sufficient supply of water.

The power plant is centrally located in the basement and consists of two 120 horsepower water tube boilers and two tandem compound high speed engines direct connected to two 100 kilowatt generators. These generators are arranged for parallel or independent operation. The fuel used is oil and a storage tank of 5000 gallons capacity has been installed with the necessary pumps and piping to supply the burners under the boilers and burners for the baking ovens in the fourth story.

Separate motors are installed throughout the building in most cases for the operation of each machine. Very little shafting has been used.

An interesting feature of the mechanical installation is the construction of the chimney which consists of a round steel stack surrounded with a square reinforced concrete shaft. A blower installed in the boiler room draws the hot air from over the boilers and drives it into this shaft where it is further heated by contact with the hot stack and discharged in the fourth story through galvanized iron ducts into dry rooms. By this means an economy in heating air for the dry rooms is effected and at the same time the boiler room ventilated.

The planning and installation of the power plant was under the direct charge of Mr. Alfred H. Potbury, M. E., who was at that time the company's engineer.

* * *

Hard on the Wall Paper

Simpkins refuses to have his flat papered," reported the agent of the building.

"What's the matter now?" inquired the owner.

"He claims they haven't room enough as it is."—Judge.

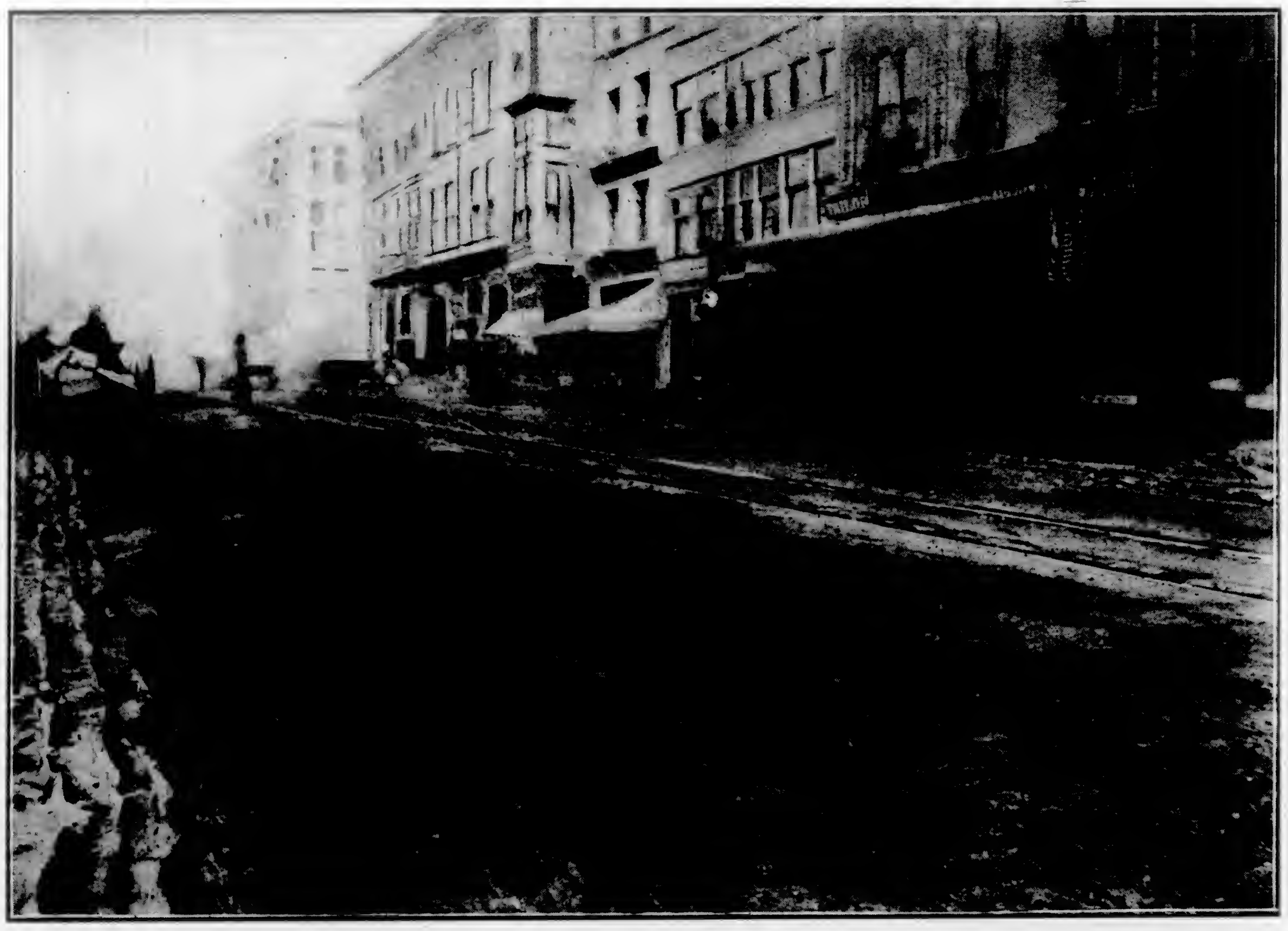
CLAY WORKER

A Perfect Pavement After 13 Year's Use, South 6th St., Terre Haute, Ind., Paved in 1891.

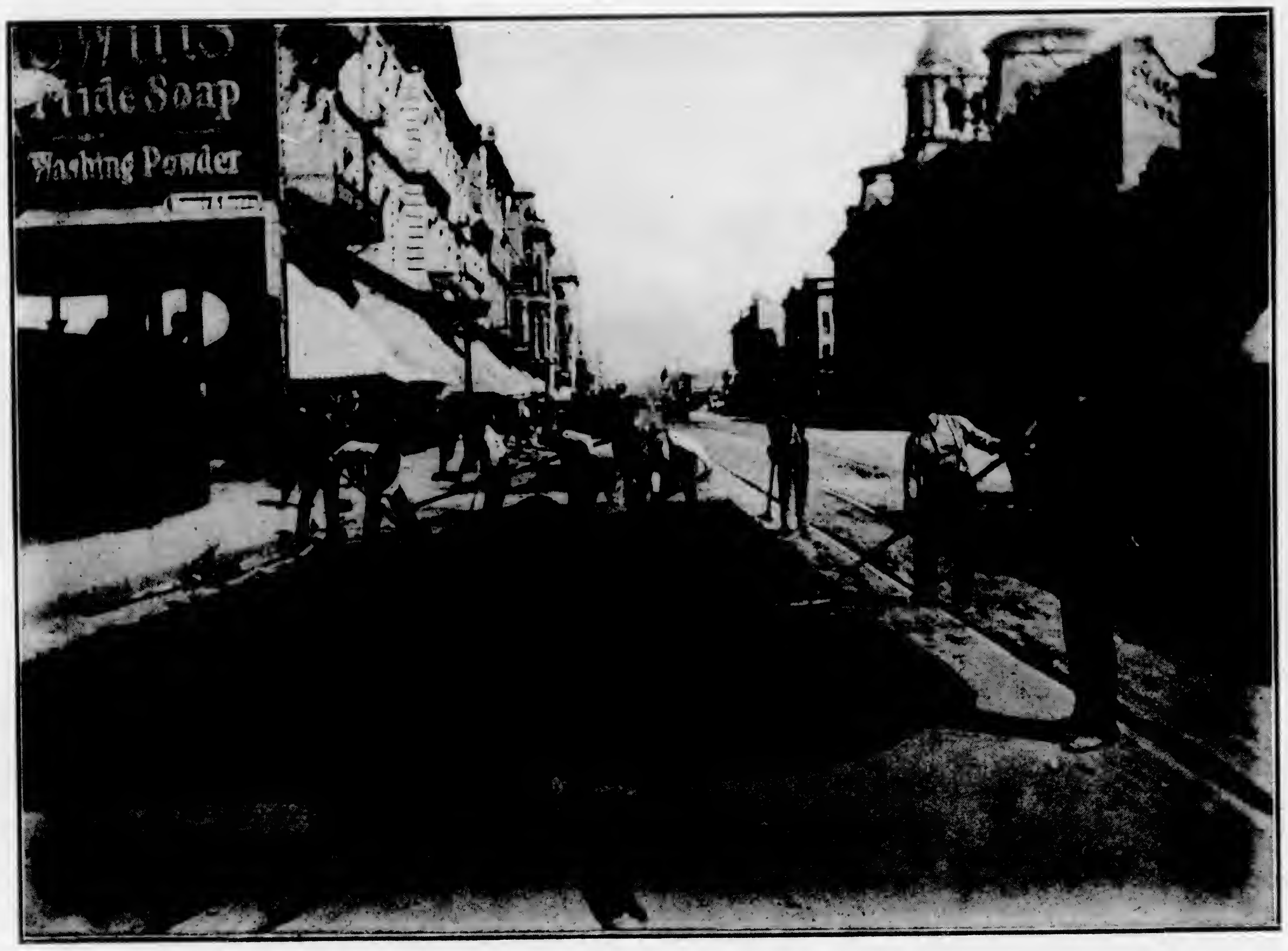
Brick Pavements the Best

MUNICIPALITIES are commencing to realize the superiority of vitrified brick for street paving. Various cities on the Pacific Coast have experimented with all kinds of paving—wood, asphalt, bitumen, granite blocks, etc.—and in each case the results have been more or less unsatisfactory. All the materials spoken of have some serious drawback. Either they lack durability or cleanliness or they are too expensive to keep in repair and in spite of all efforts lose their shape and neat appearance after a few year's use.

Brick is durable, non-absorbent, dustless, and the cheapest street to keep in repair on the market. A glance at the illustrations shown herewith should convince the skeptic of the superiority of brick pavements without further argument.

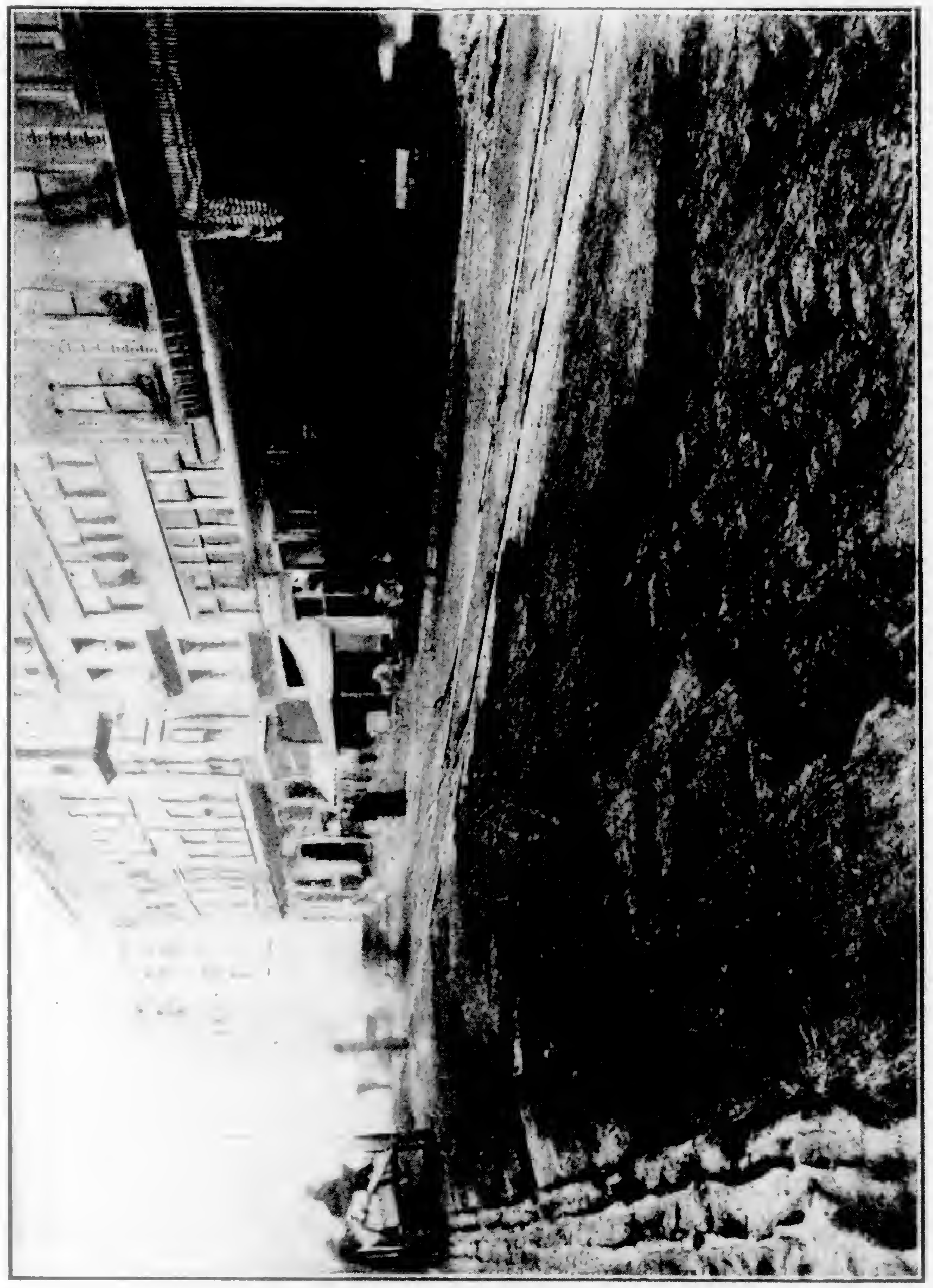


Chronic Condition of the Best Asphalt Street in Los Angeles. First Street between Spring and Broadway.



An Everyday Scene on Asphalt Streets. Gang of Men Patching Ruts in the Asphalt Pavement of Short Duration on North Main Street, Los Angeles. It Costs the City $1000 a week

Chronic Condition of the Best Asphalt Street in Los Angeles. First Street between Spring and Broadway.



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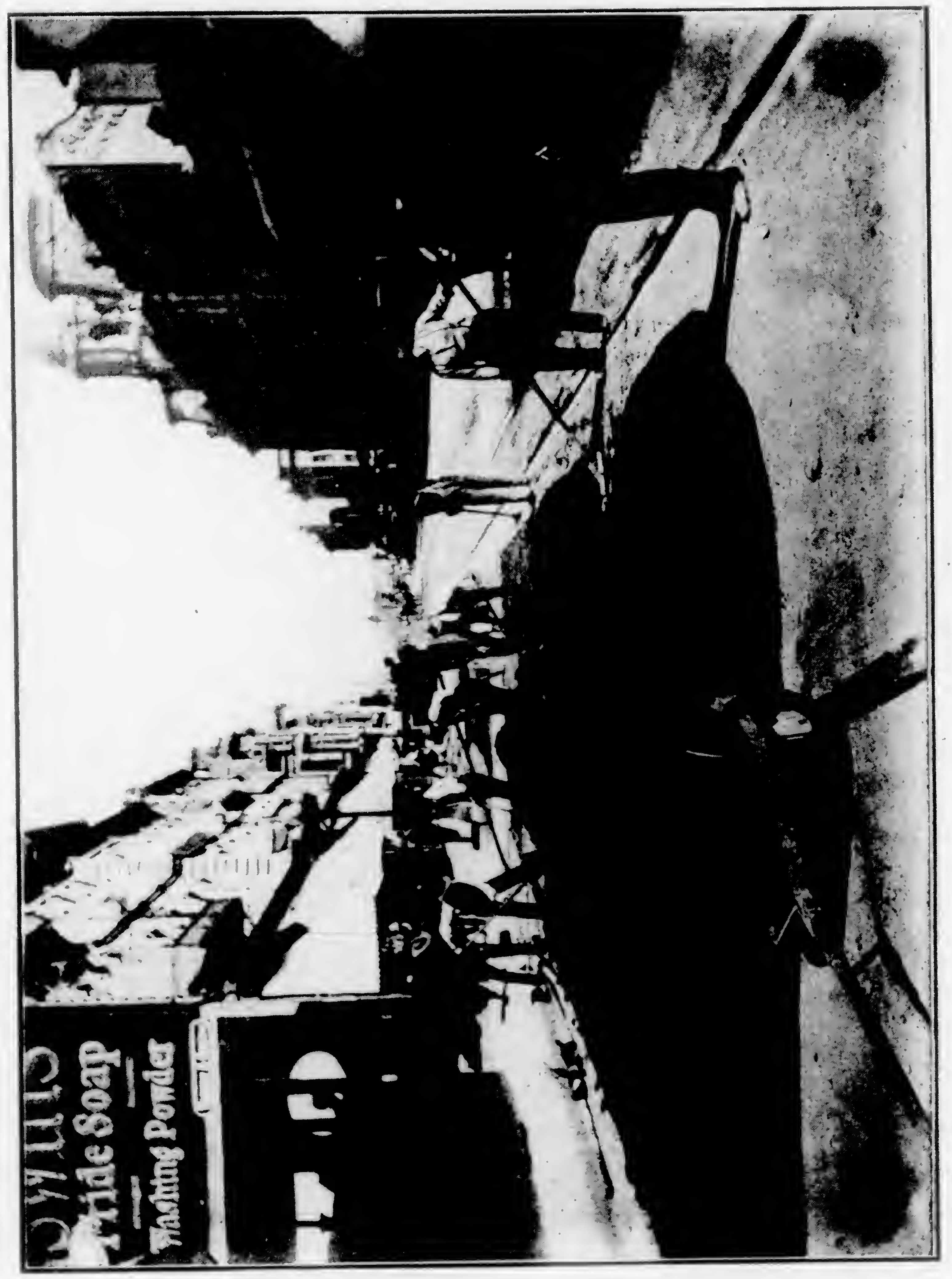
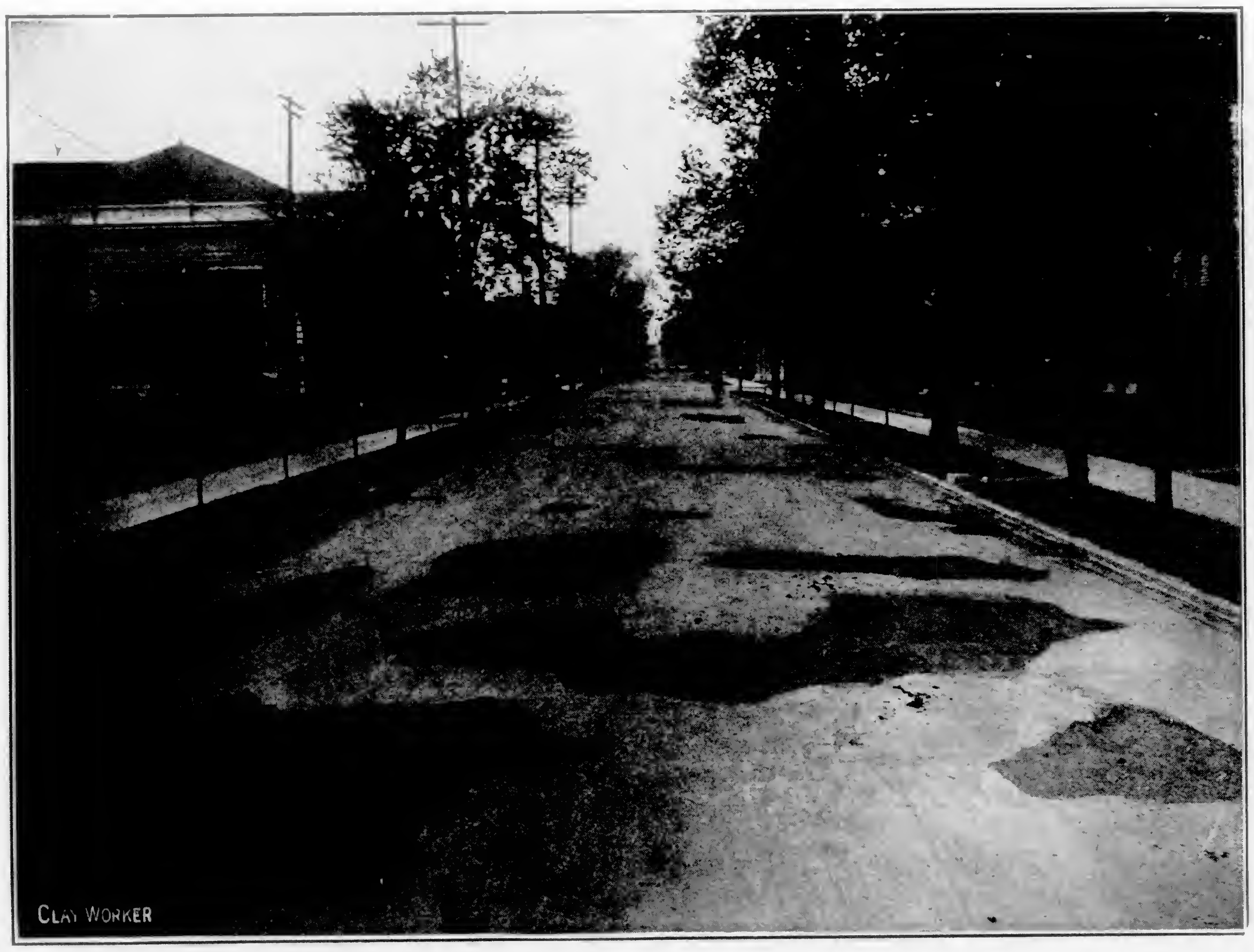
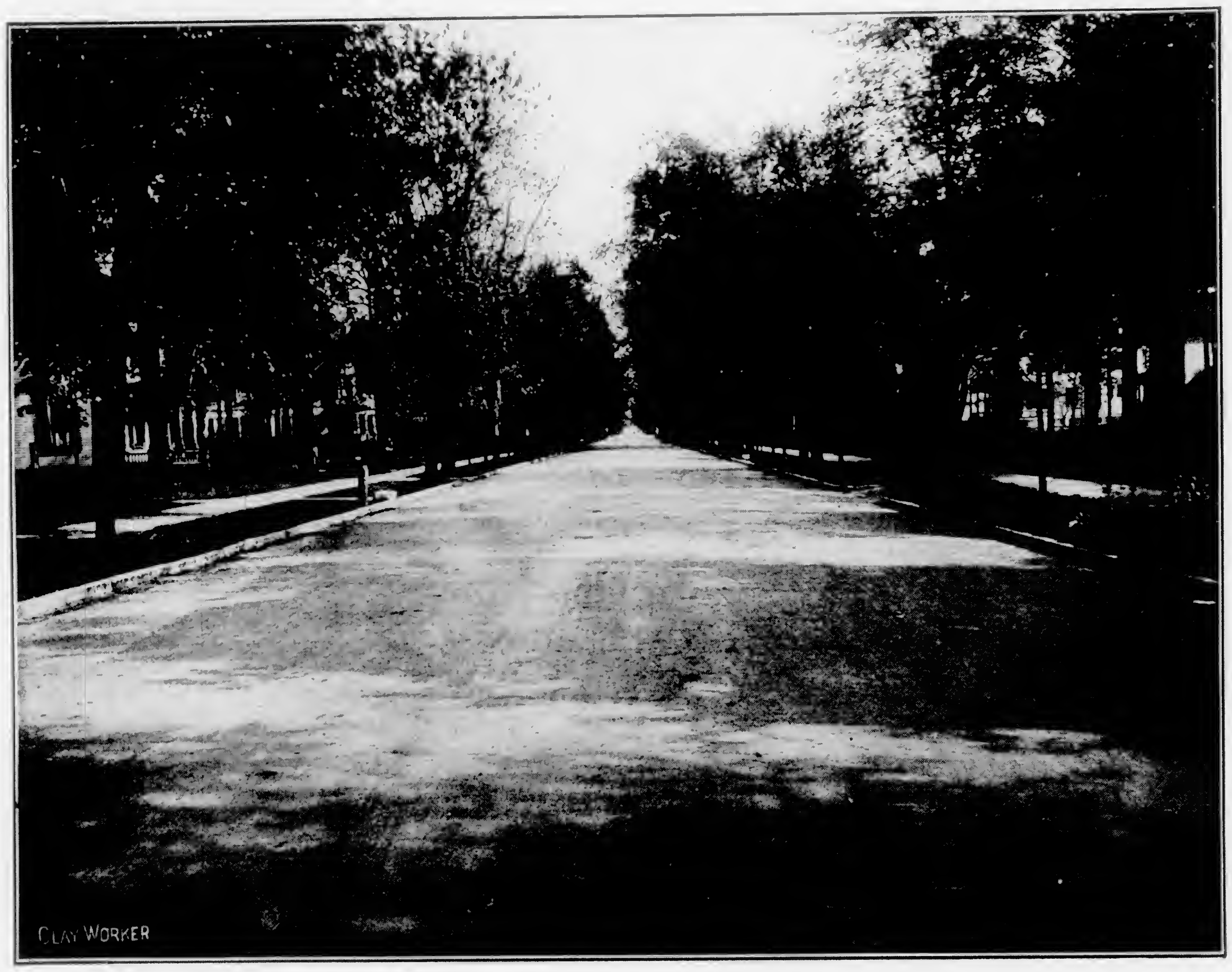


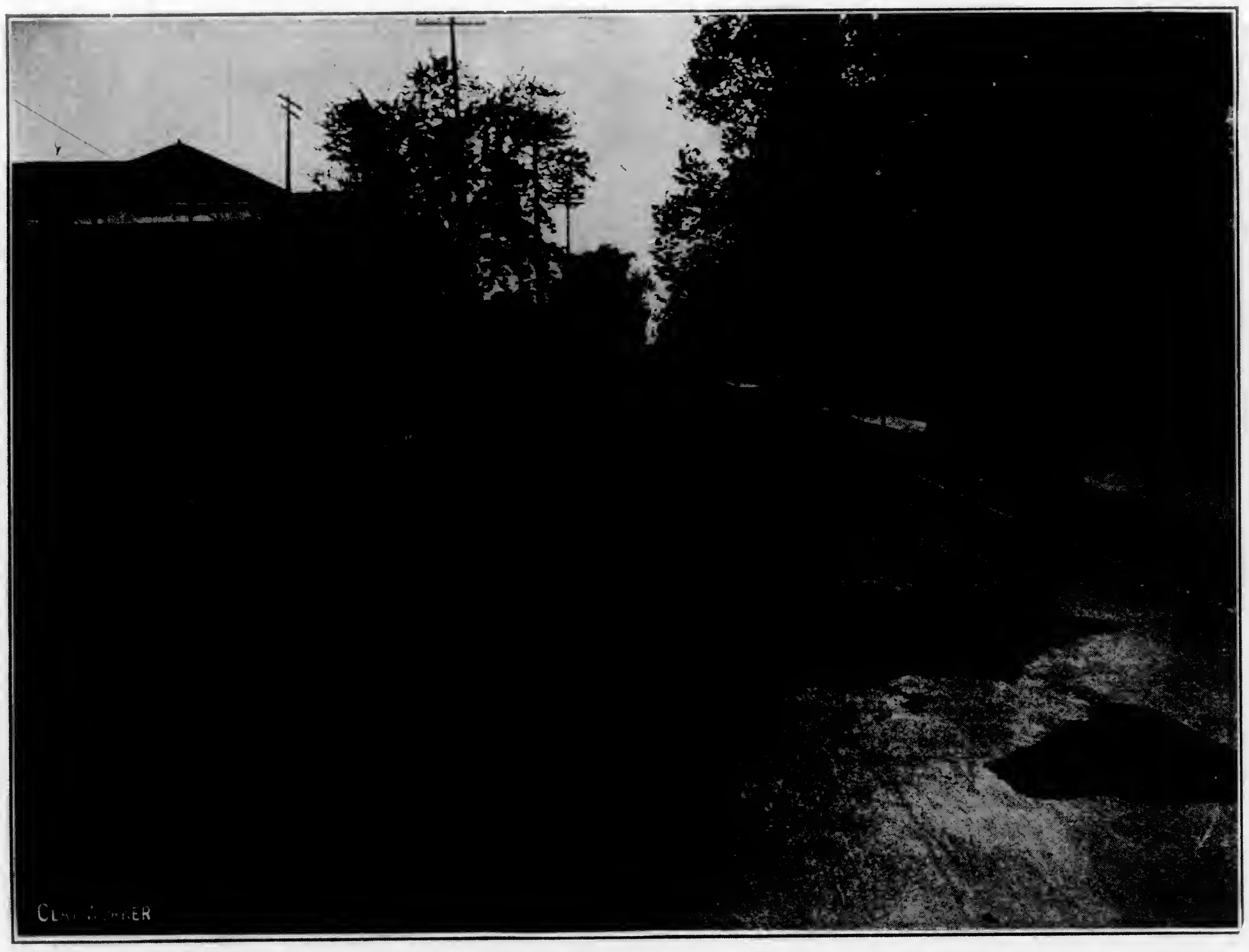


North Seventh Sreet, Terre Haute, Paved with Asphalt in 1893. Look at it now. Compare with Opposite Page Where is Shown a Brick Street, Same City, Down more Years and Still in Perfect Condition.

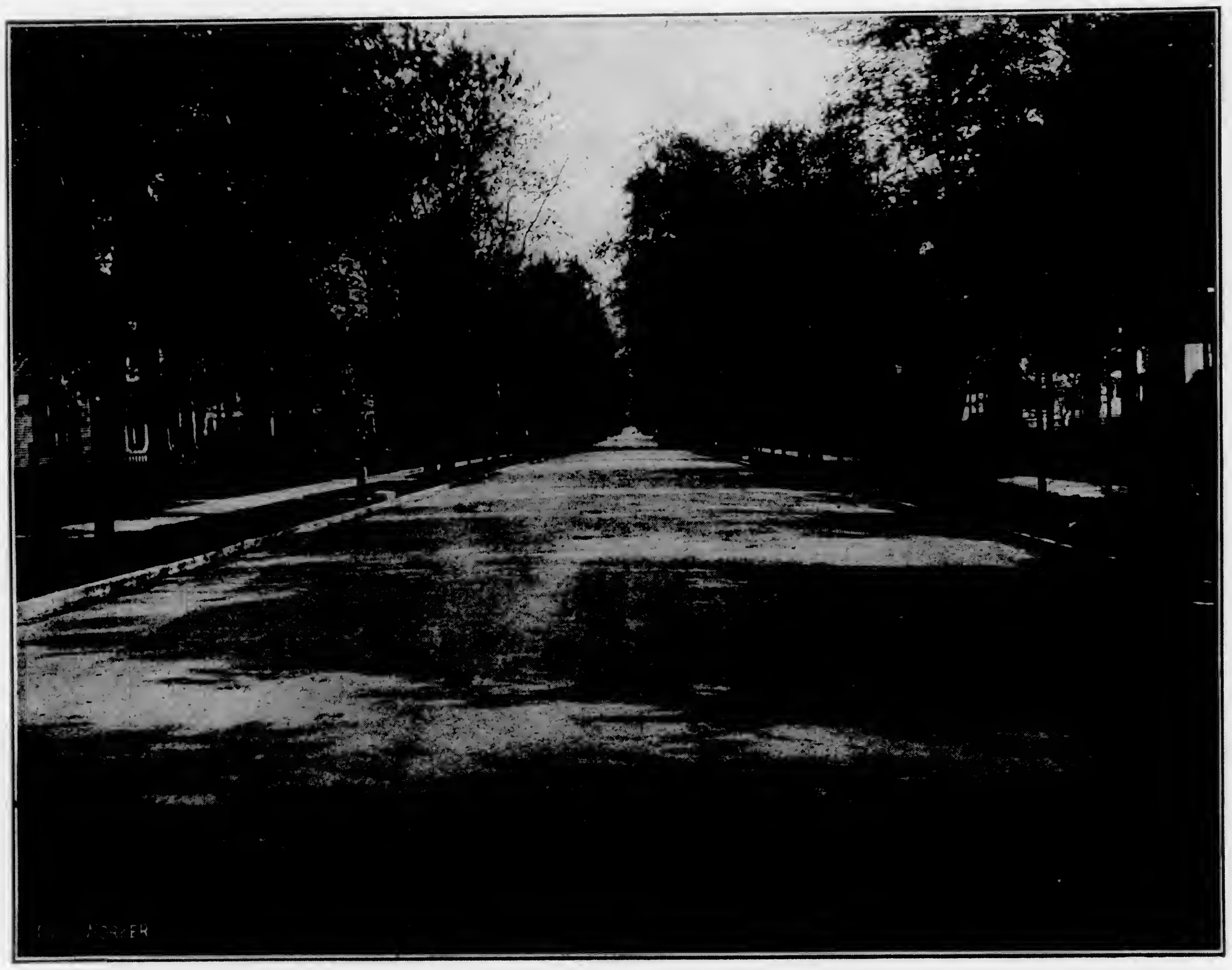


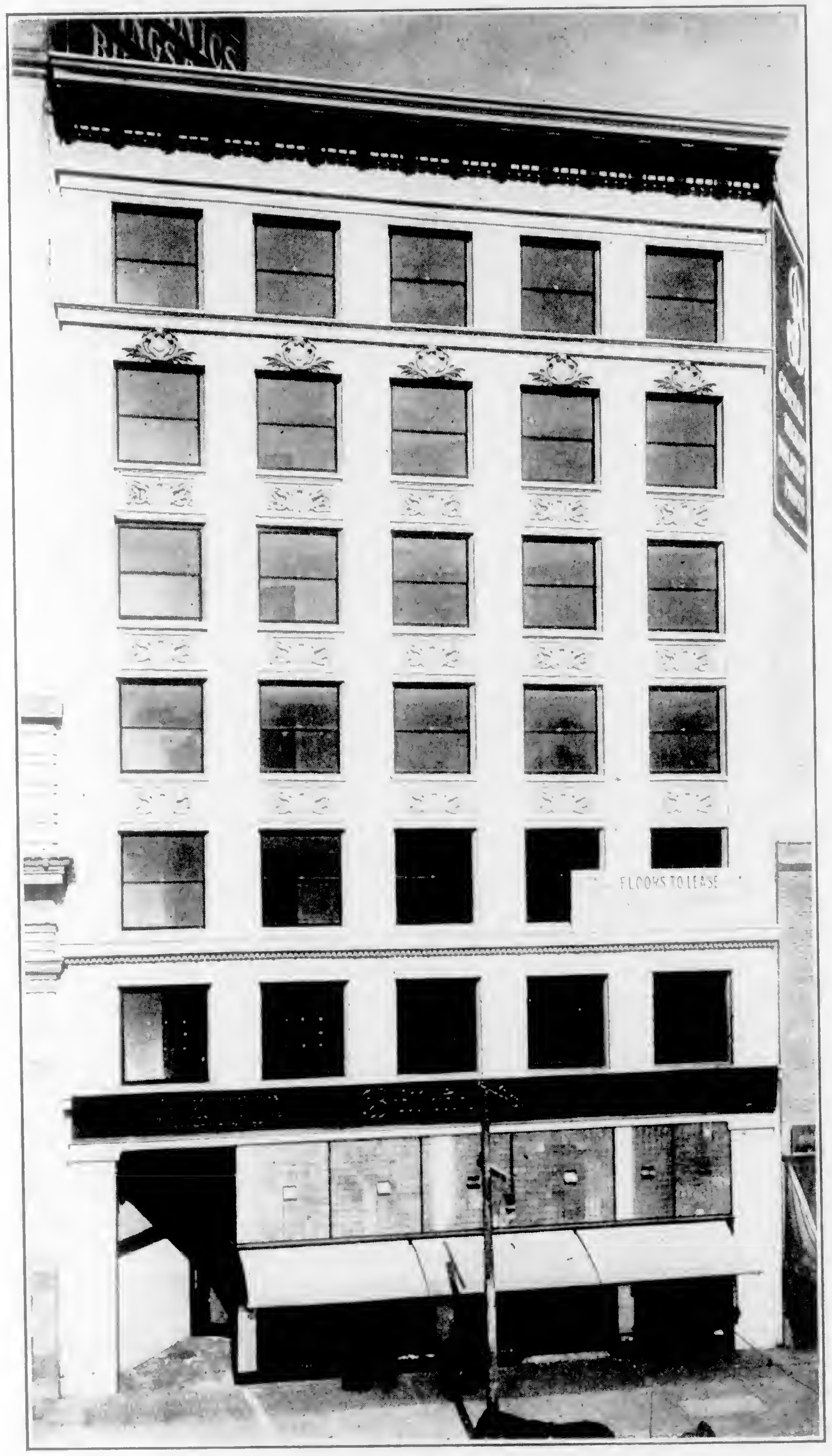
South Sixth Street, Terre Haute, Ind., Paved with Brick in 1891. Photograph taken in 1907. Street down 16 Years. Condition Perfect. No Cost for Repairs.

North Seventh Sreet, Terre Haute, Paved with Asphalt in 1893. Look at it now. Compare with Opposite Page Where is Shown a Brick Street, Same City, Down more Years and Still in Perfect Condition.

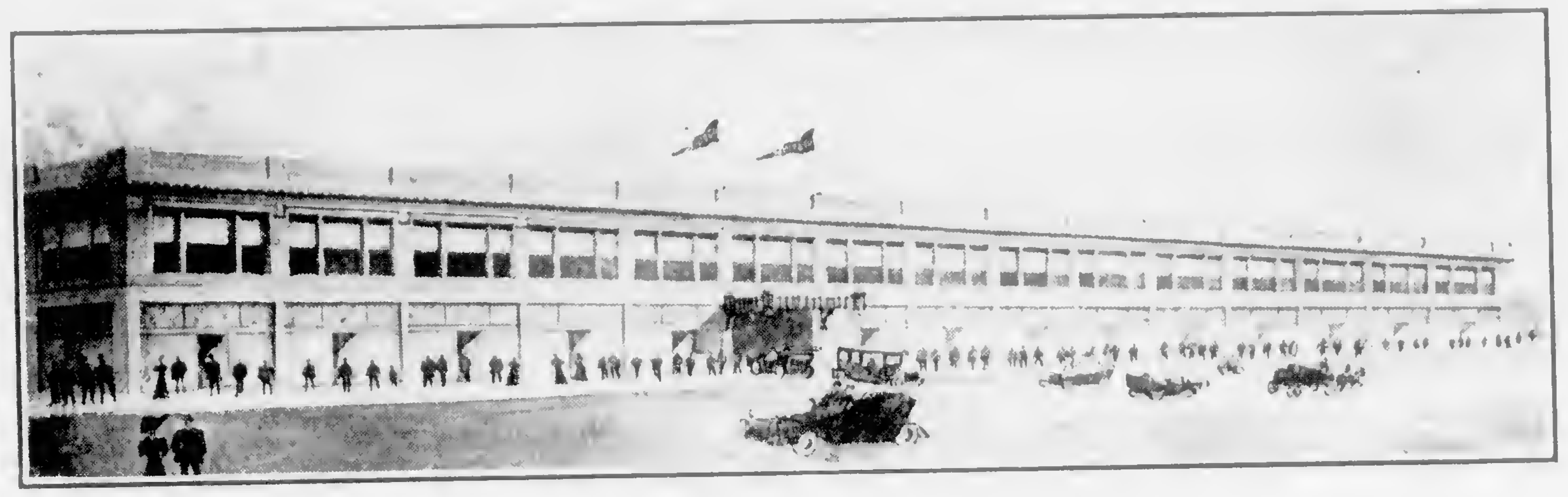


South Sixth Street, Terre Haute, Ind., Paved with Brick in 1891. Photograph taken in 1907. Street down 16 Years. Condition Perfect. No Cost for Repairs.





Drexler Building, San Francisco
Healy-Tibbitts Construction Co., Contractors *Reid Bros., Architects*



White Garage and Office Building, San Francisco
MacDonald & Applegarth, Architects

San Francisco -- The Fireproof Concrete City

By CHARLES C. HORTON.*

THERE is an indescribable something in the atmosphere of San Francisco which makes men fearless. Whether this indomitable spirit is a matter of environment, inheritance or contagion, does not matter. It is a manifest fact. The calamity of 1906, which absolutely wiped out the existence of the entire business of the city and which fairly staggered the civilized world, was taken as only a matter of temporary "hard luck" by San Francisco. There was no wailing over the tremendous financial losses; a few days were given to rounding up the scattered families in a tent on the sunny slopes of the hills or in any shelter offered—another few days spent in locating business associates, and then the work of rebuilding the city began.

A burned city dreads a fire—and the lesson taught by the catastrophe has not been forgotten. In the reconstruction most men have striven to make a general conflagration impossible—"fireproof" is the watchword, and an owner who ventures upon any other form of construction is looked upon with suspicion.

The high cost of "Class A" buildings, that is, buildings of steel frame and fireproof walls and floors, has made some owners hesitate because "money is tight." The inflammable character of "Class C" makes it very undesirable, not only because of the danger of fire, but because of the high rate of insurance demanded by the companies and also because of the constant depreciation of that type of structure.

Reinforced concrete, therefore, is the child of necessity. Cheaper by forty per cent than a "Class A" building and costing but a little more than "Class C," it is without doubt the most favored form of construction; reinforced concrete being monolithic is as strong or stronger than a steel frame and has the advantage of not only being of lower cost, but it positively improves with age—the more aged the concrete, the harder and stronger it becomes, while the steel reinforcement imbedded in the cement, hermetically sealed as it is, never corrodes or depreciates in value.

San Francisco has been slow to appreciate the full merits of reinforced concrete. In nearly every other part of the world it is adopted as the best form of construction.

In comparison with a "Class C" building, while the original cost is somewhat higher, this additional investment is recovered in a very few years in insurance premiums and reduced cost of maintenance.

Reinforced concrete means security—security against fire or earthquakes.

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* Mr. Horton is secretary of the Healy-Tibbitts Construction Company, Hansford Building, San Francisco.

FLOORS TO LEASE

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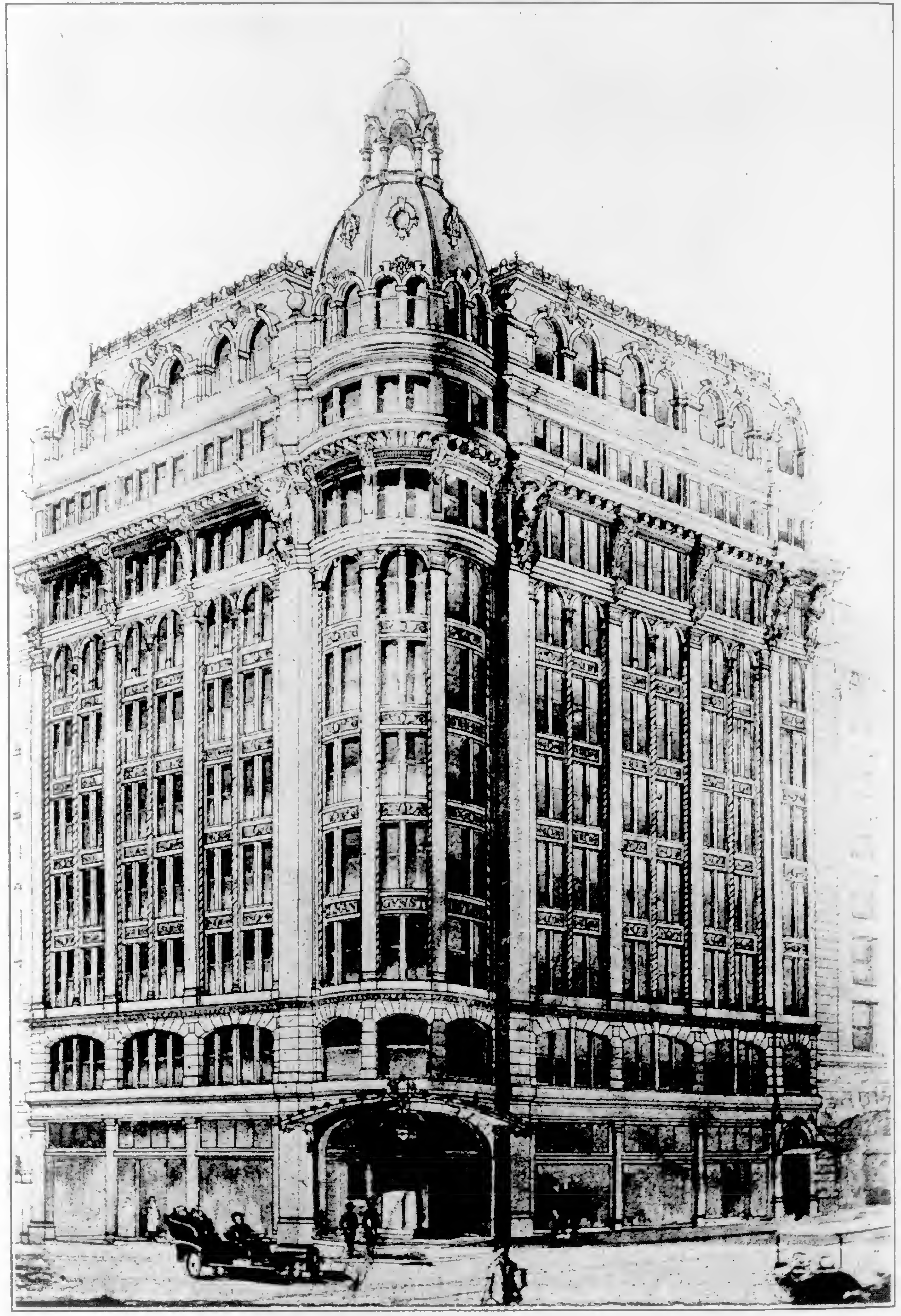

M. A. Gunst Building, San Francisco
Lansburgh & Joseph, Architects

Fireproofing by Healy-Tibbitts
Construction Company

Equipped with Otis
Elevators

The cost of a reinforced concrete building in San Francisco has been reduced during the past two years almost fifty per cent. This is due to local conditions. After the fire certain contractors coming from the East with claims of long experience in concrete construction set a pace which was unnatural and which our local contractors were quick to discover was absurd. But some owners being impressed with the statements made by the "wise men of the East," were led into extravagances which prejudiced many against concrete. This prejudice has happily been almost eliminated and San Francisco will in the near future be known as the "Fireproof Concrete City."

* * *

Work of the Healy-Tibbitts Construction Company

GENERAL Contracting is, as a rule, a precarious business—for each success there are a hundred failures in that particular line. The general contractor who succeeds—like the artist in any other line—is born, not made. He must be resourceful, quick to think and quick to execute. He must have confidence in himself and confidence in his figures—above all, he must be a cheerful loser. A man possessing these characteristics is pretty sure to succeed in the general contracting business, and success is the true measure of men after all.

The Healy-Tibbitts Construction Company, which was formed twenty-two years ago in San Francisco, is an example of what can be done by men who are fitted by nature to do big things. In almost every county in this state and in adjacent states, spanning roaring rivers or deep chasms, some of them fifty miles from a railroad and in almost inaccessible places, are great steel or concrete bridges. Each bears a modest little brass or iron plate which conveys the information that the Healy-Tibbitts Construction Company were the builders. This does not mean much to the ordinary traveler, but to the driver of the traction engine or the heavy steam road roller it means that the bridge is strong and safe to cross with an extraordinary load.

Across the Pacific in the far away island possessions of our Uncle Sam and in a thousand places in New San Francisco there are lasting monuments to the enterprise and business sagacity of the Healy-Tibbitts Construction Company.

At the close of the Spanish-American war, when the authorities at Washington suddenly realized that our coasts were practically defenseless, it was decided that the United States should have ships of war to protect both coasts and that no time should be lost in preparing for possible trouble with other nations. Once awakened, the authorities wanted immediate action everywhere. Coast defenses were ordered, and ships contracted for. Ships must have safe harbors of refuge and stations for coaling and repairs. The first place selected for a coaling station and general supply depot in the Pacific was Pago Pago Harbor in Tutuila, and the Healy-Tibbitts Construction Company entered into a contract with the Government for the complete work, costing upwards of $2,000,000, including the dredging, wharfs, coal chutes and warehouses. This work was done in a record-breaking period and delivered long before the agreed time.

The big plant of the French Tahiti Commercial Company at Tahiti, with its extensive wharves and warehouses, and which cost almost a quarter of a million dollars, is another splendid production of the Healy-Tibbitts Construction Company.

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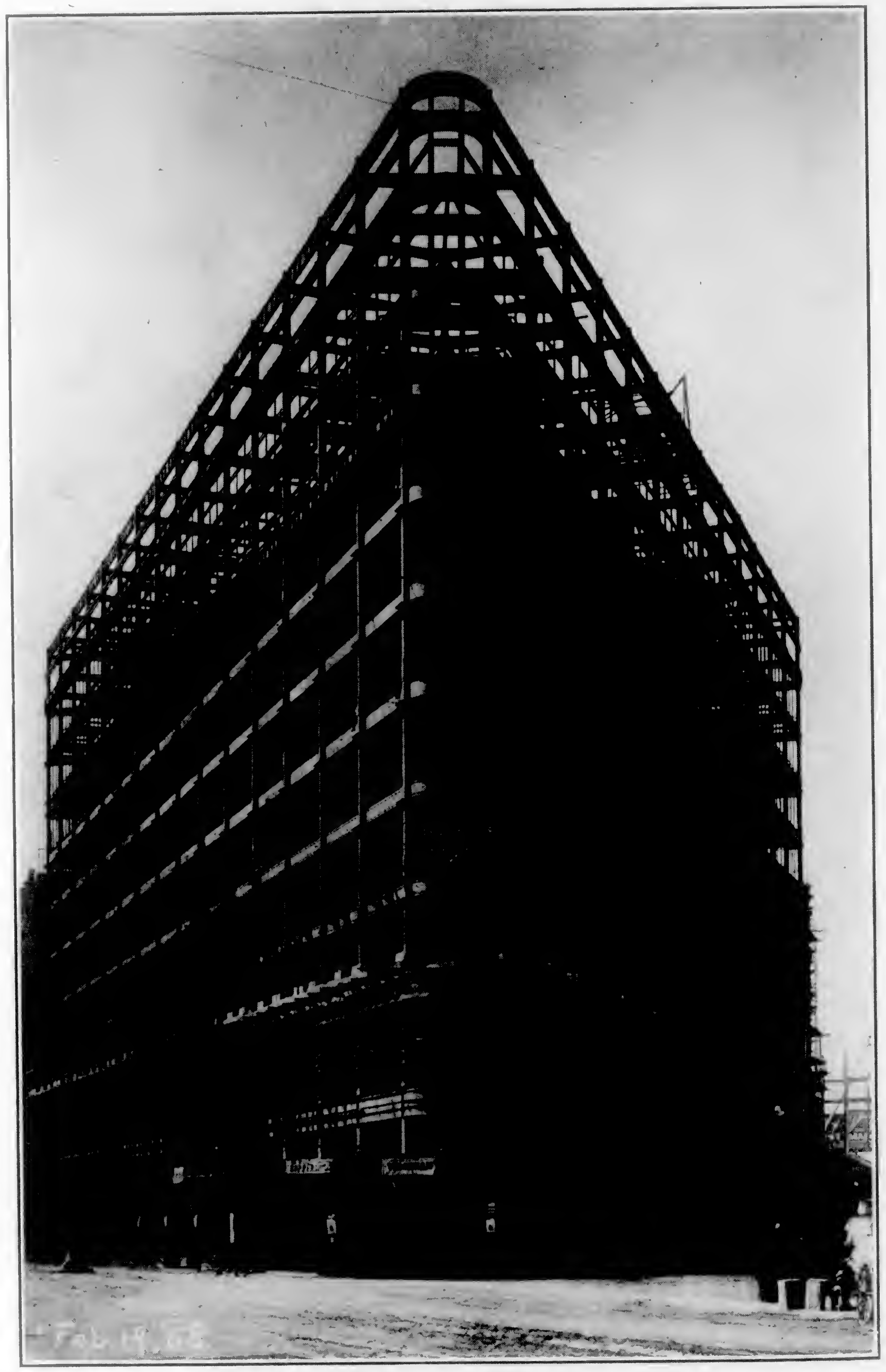
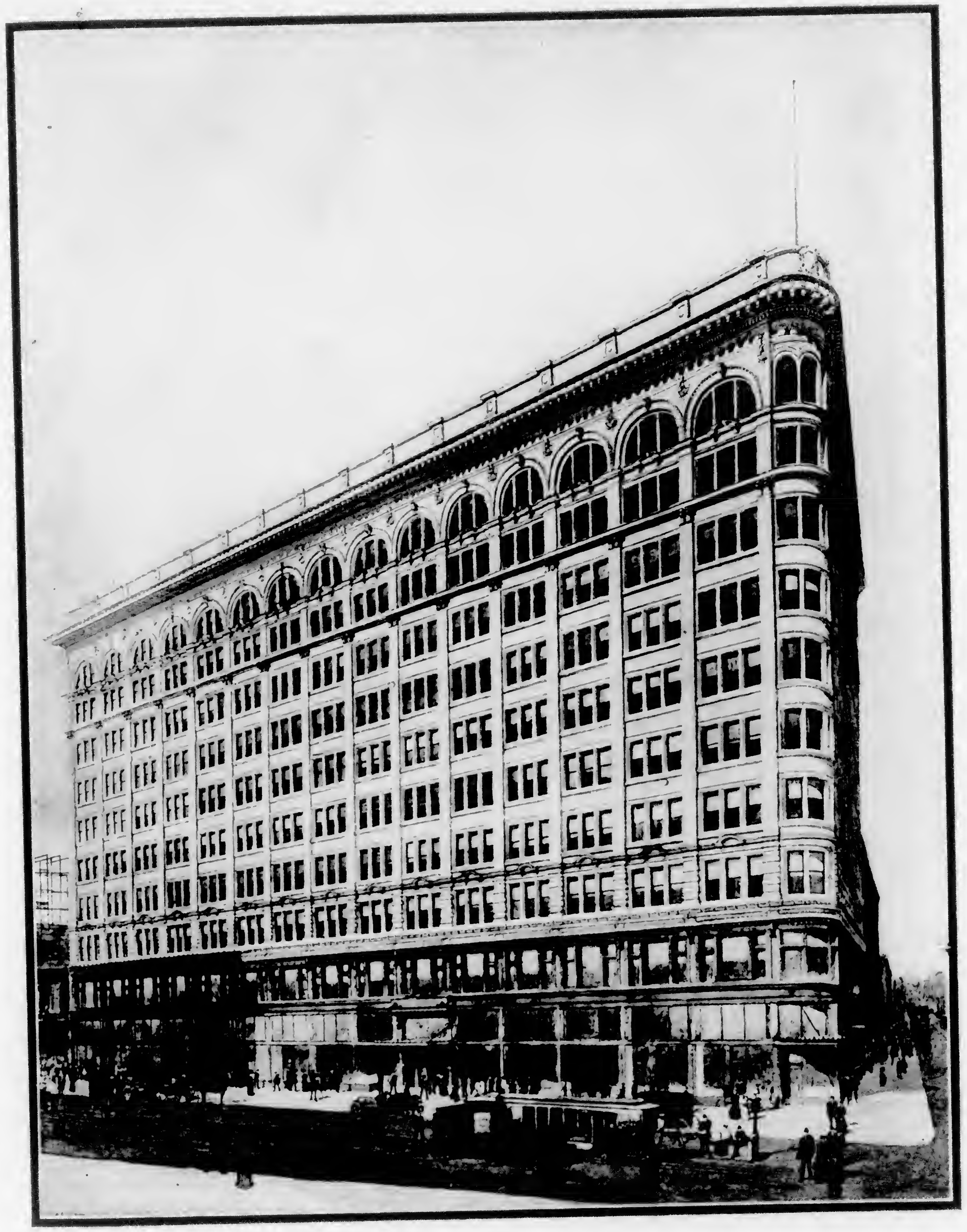
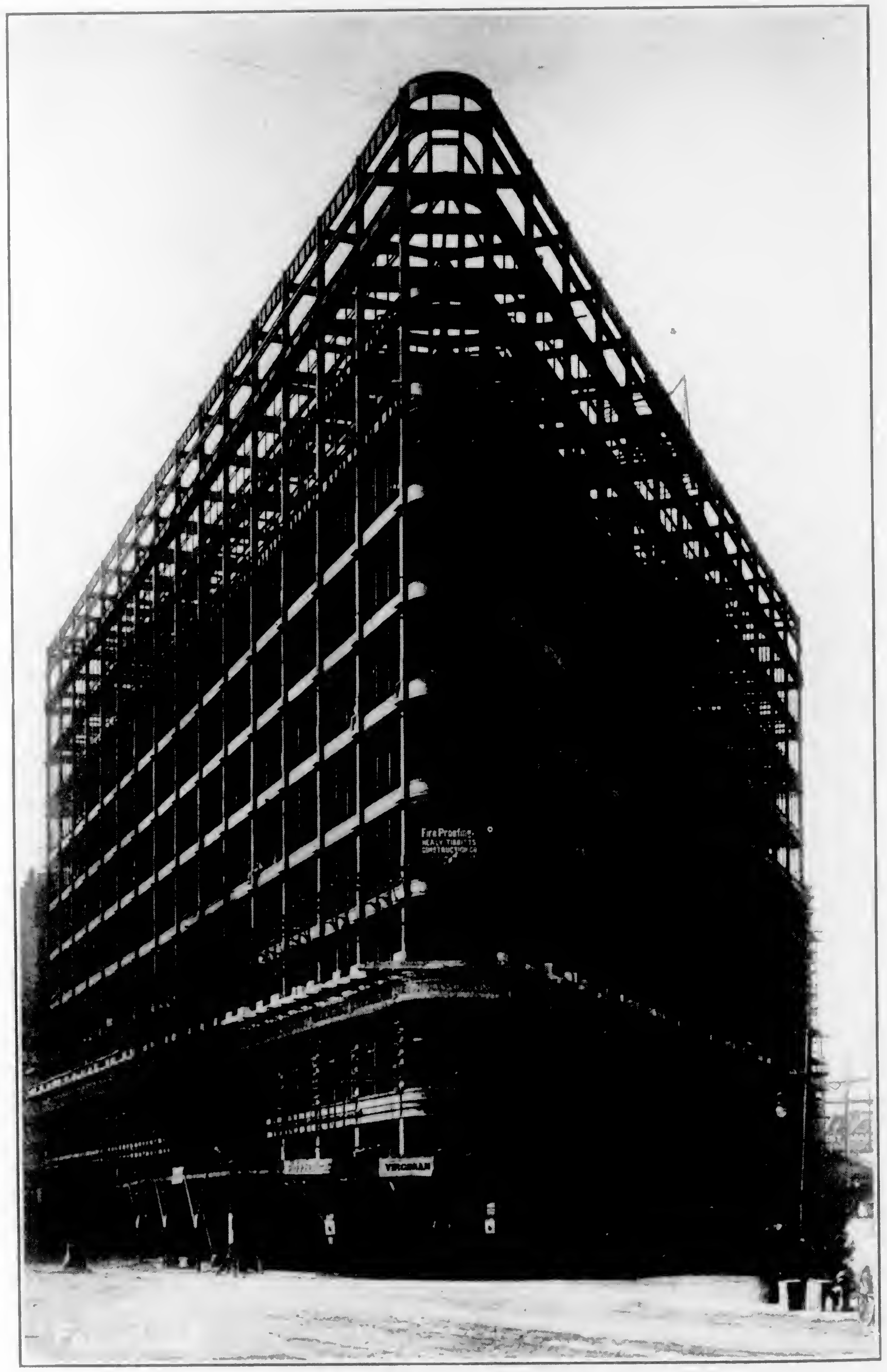


Steel Frame of Phelan Building, San Francisco, Showing Fireproofing by Healy-Tibbitts Construction Co.
William Curlett, Architect



Phelan Building, San Francisco, As It Looks Today
Equipped with Otis Elevators *William Curlett, Architect*


Fire Proofing
HEALY TIBBITTS CONSTRUCTION CO
VROOMAN

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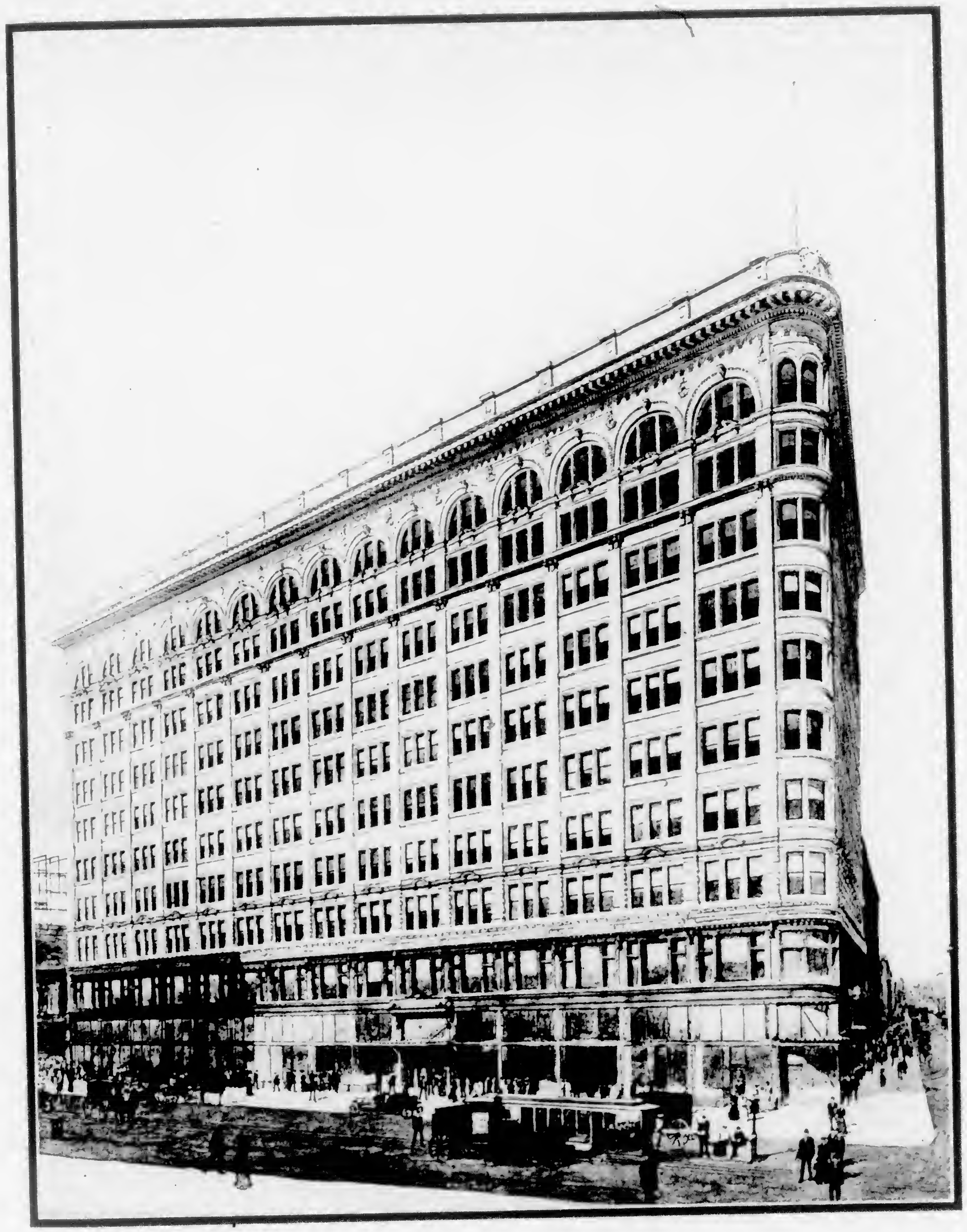

Phelan Building, San Francisco, As It Looks Today
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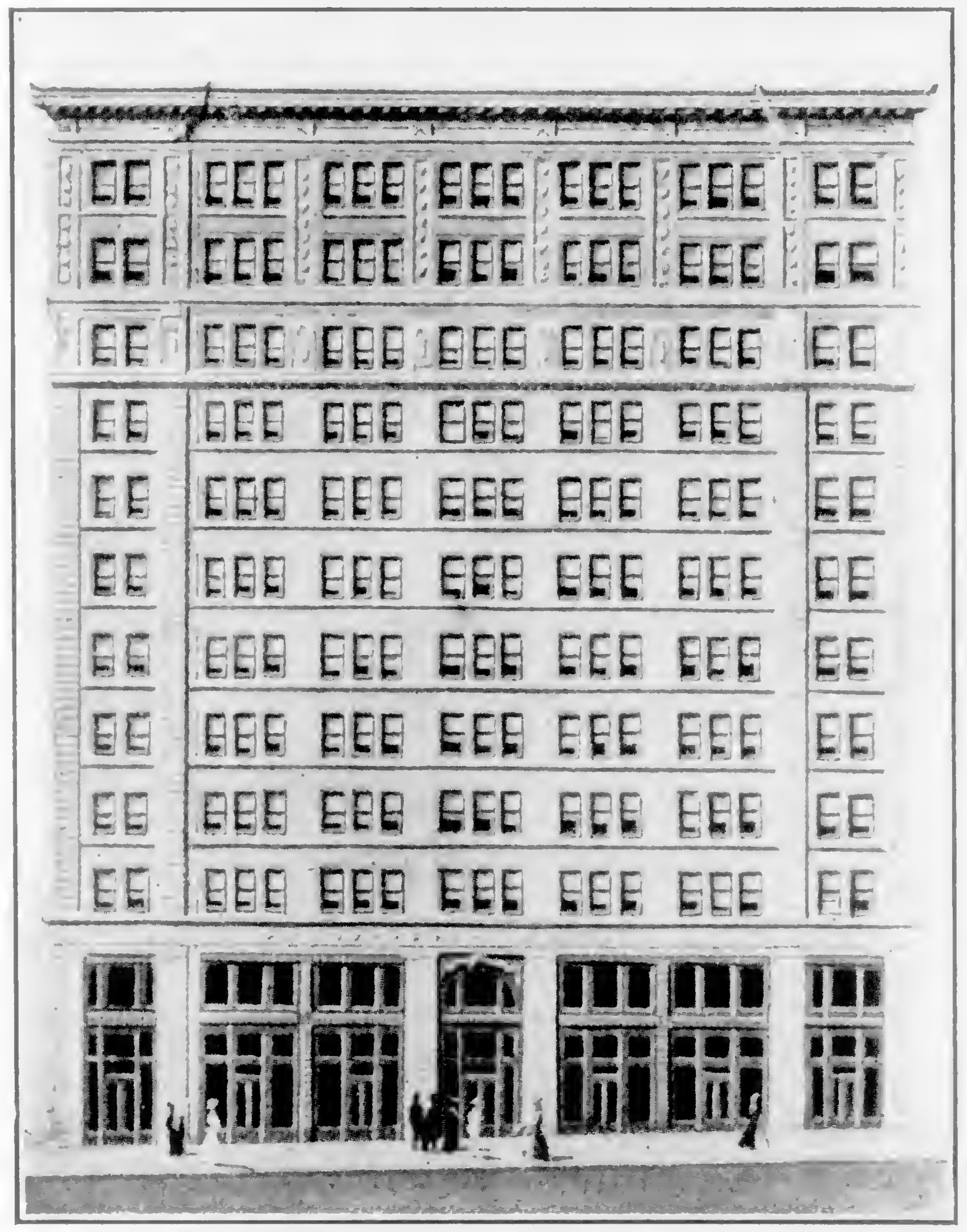
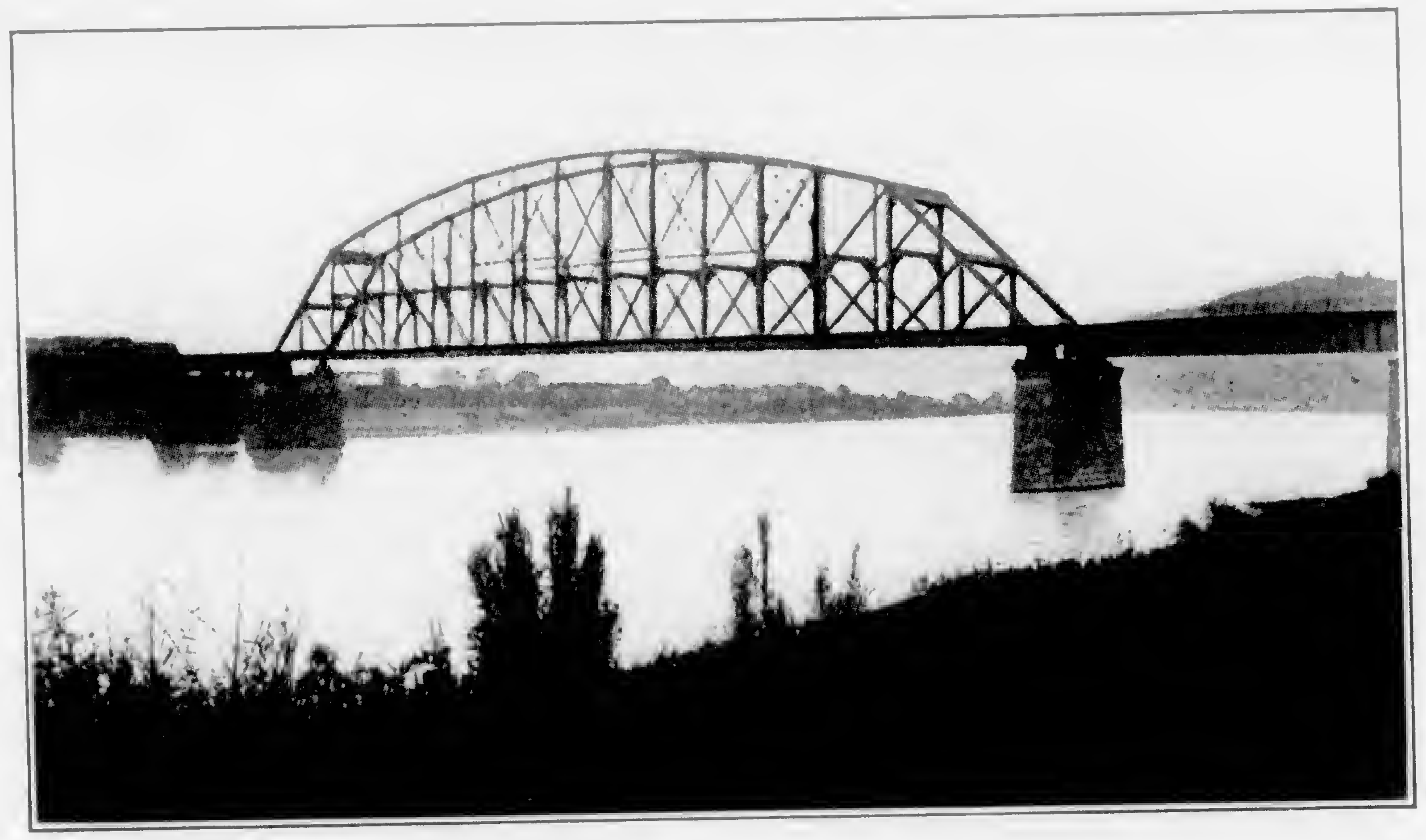
Strauss, Levi Realty Co. Building, San Francisco
Howard & Galloway, Architect and Engineer



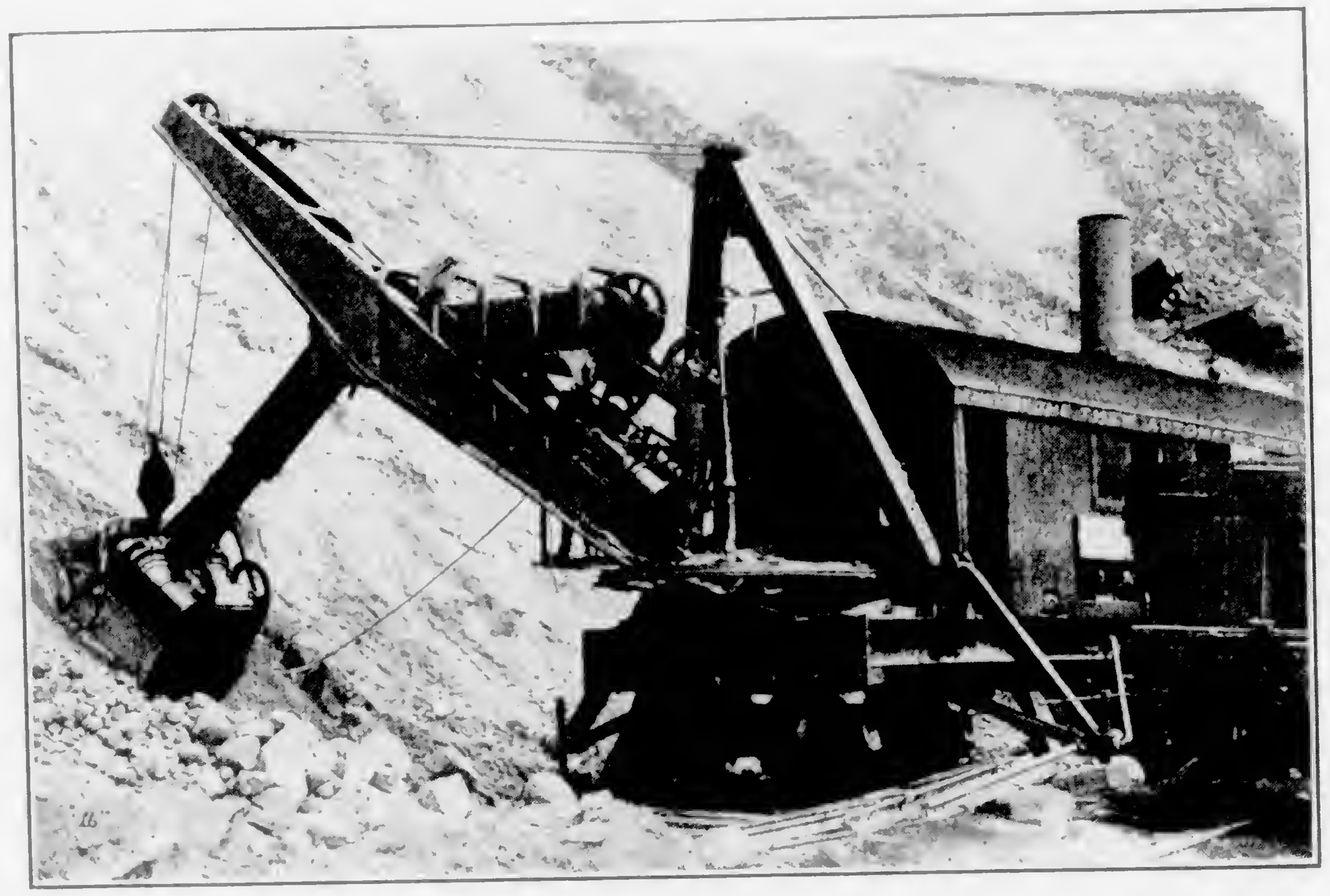
Adam Grant Building, San Francisco
Howard & Galloway, Architect and Engineer

Fireproofing of these two Buildings by Healy-Tibbitts Construction Co.

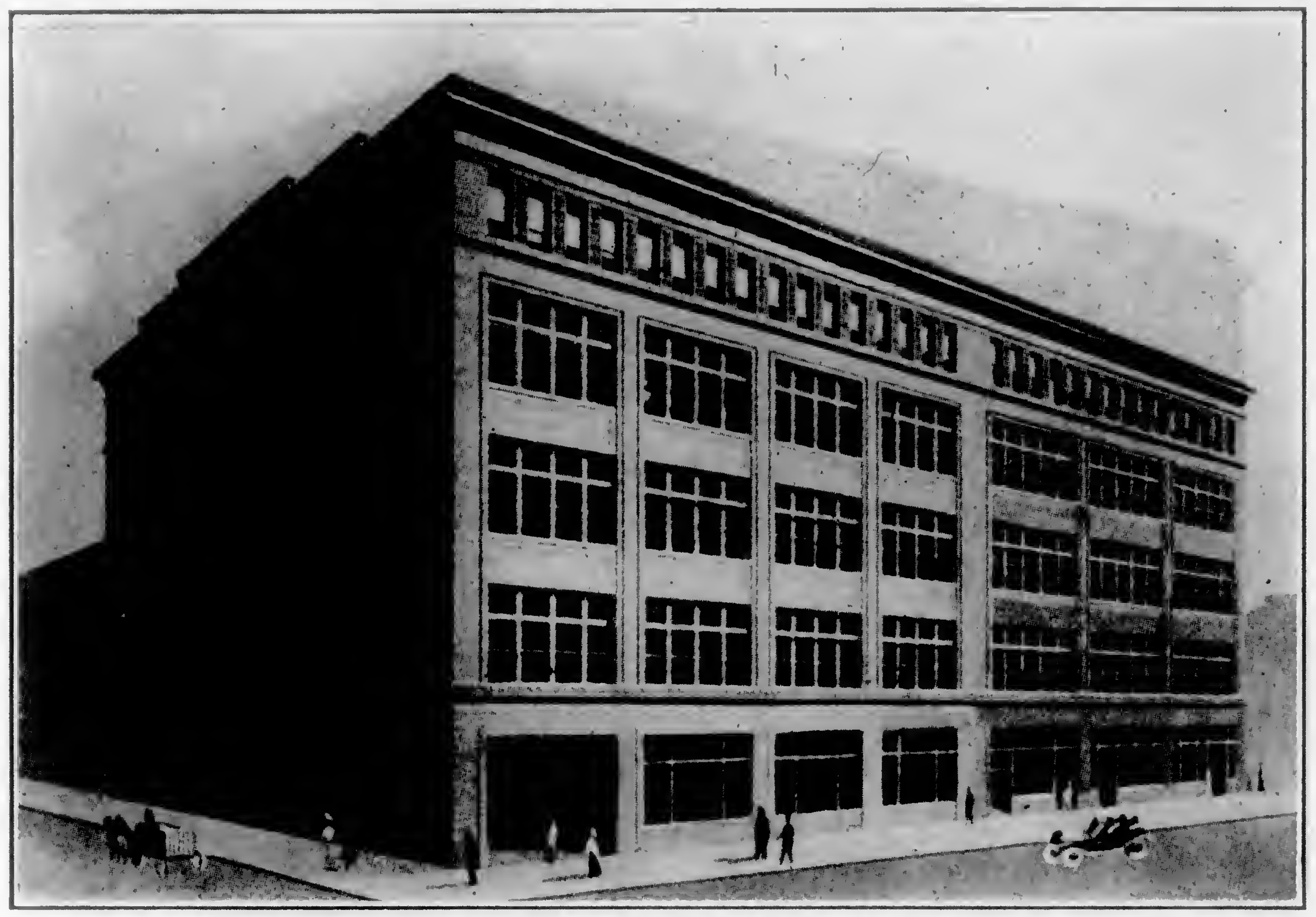
Equipped with Otis Elevators



Bridge over Eel River, Mendocino County, Cal.



Steam Shovel Equipment, Healy-Tibbitts Construction Co., Excavating for Selby Smelting and Lead Co., at Baden, Cal.



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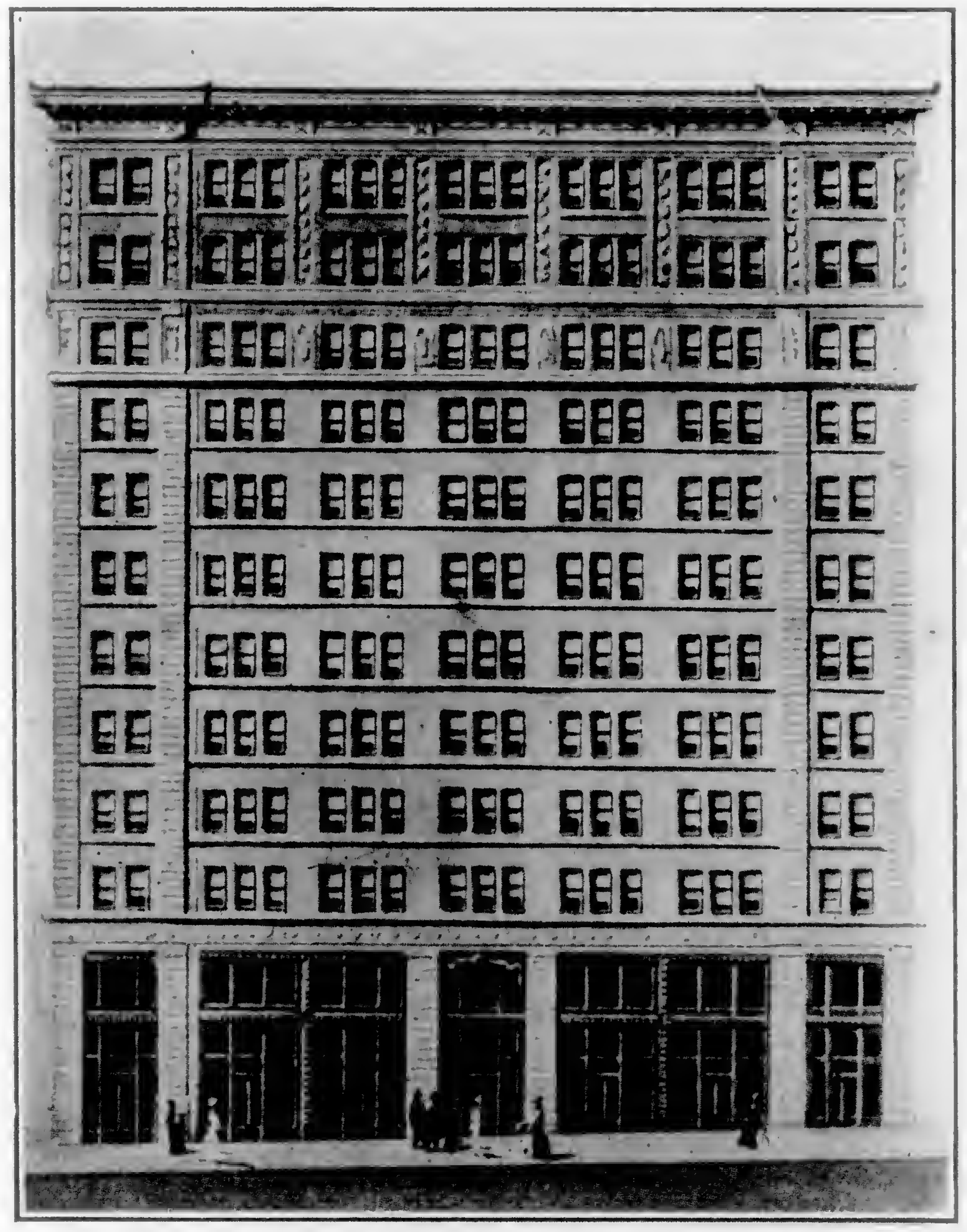

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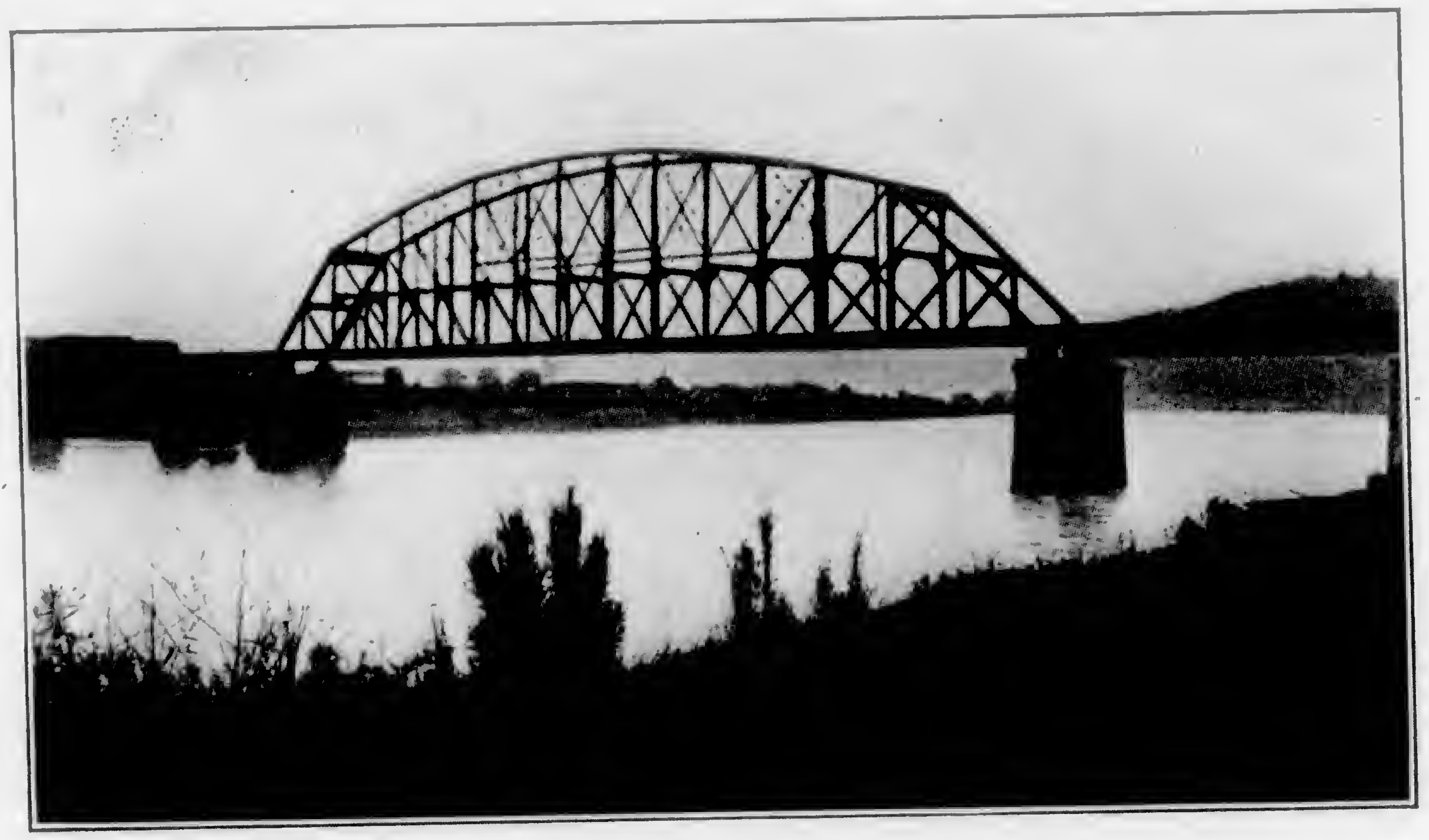

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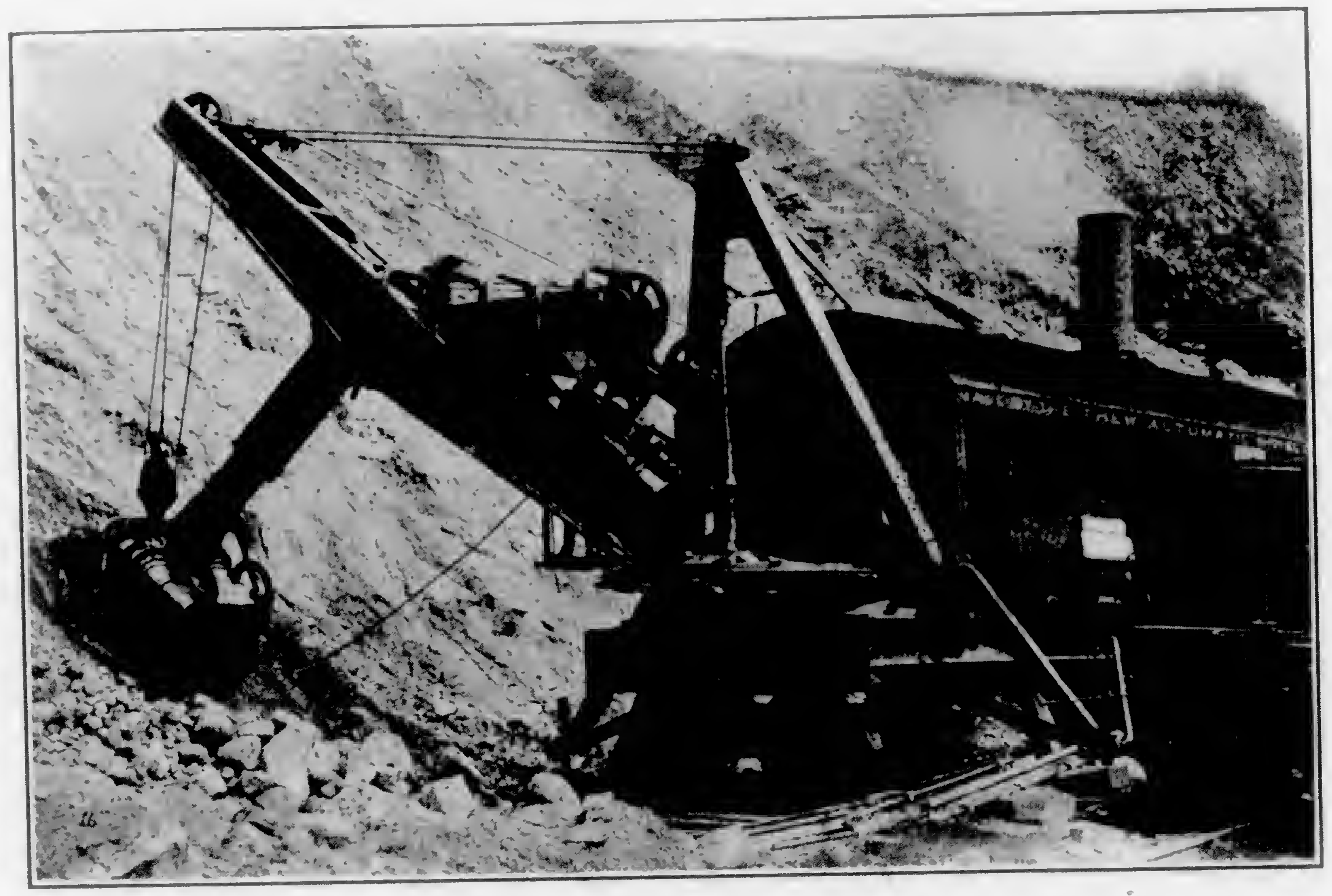

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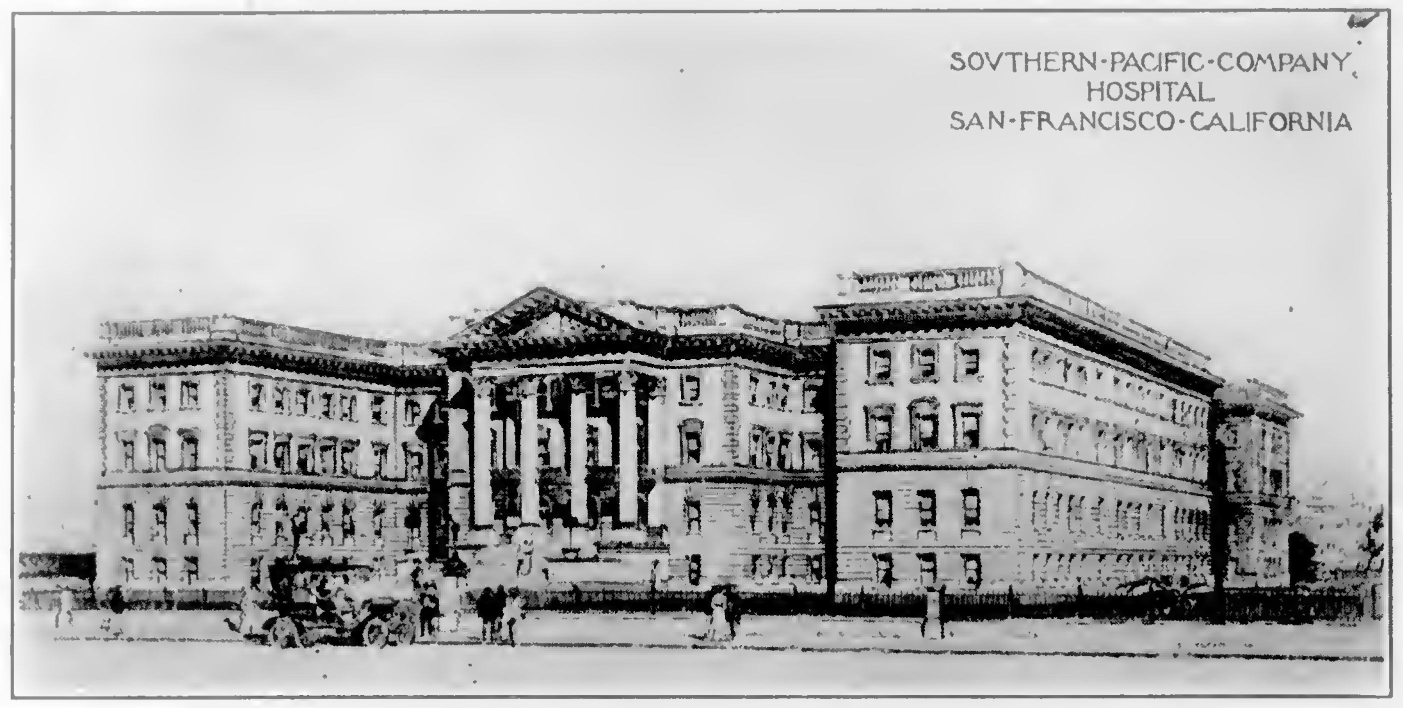
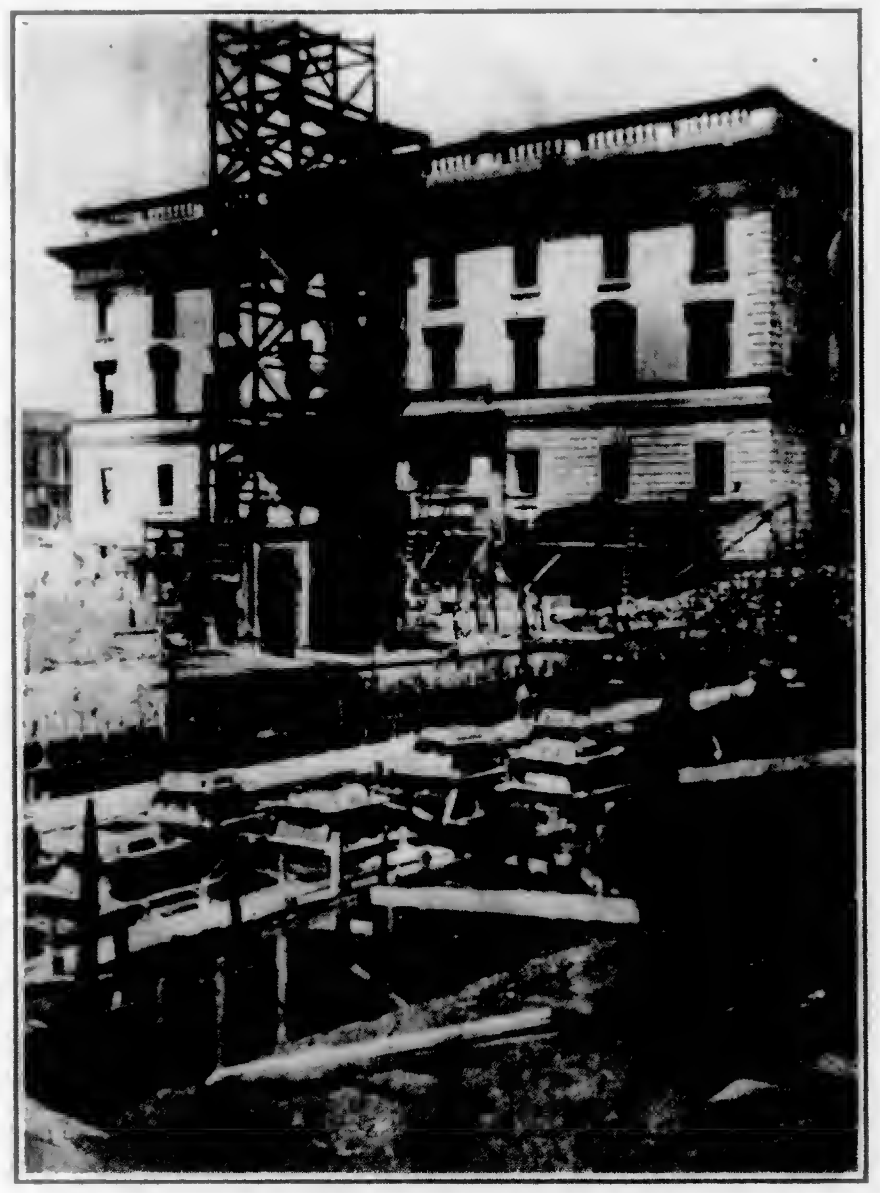

SOVTHERN-PACIFIC-COMPANY
HOSPITAL
SAN-FRANCISCO-CALIFORNIA

Southern Pacific Hospital, San Francisco
D. J. Patterson, Architect
Healy-Tibbitts Construction Co., Contractors



Progress Work, Southern Pacific Hospital, San Francisco

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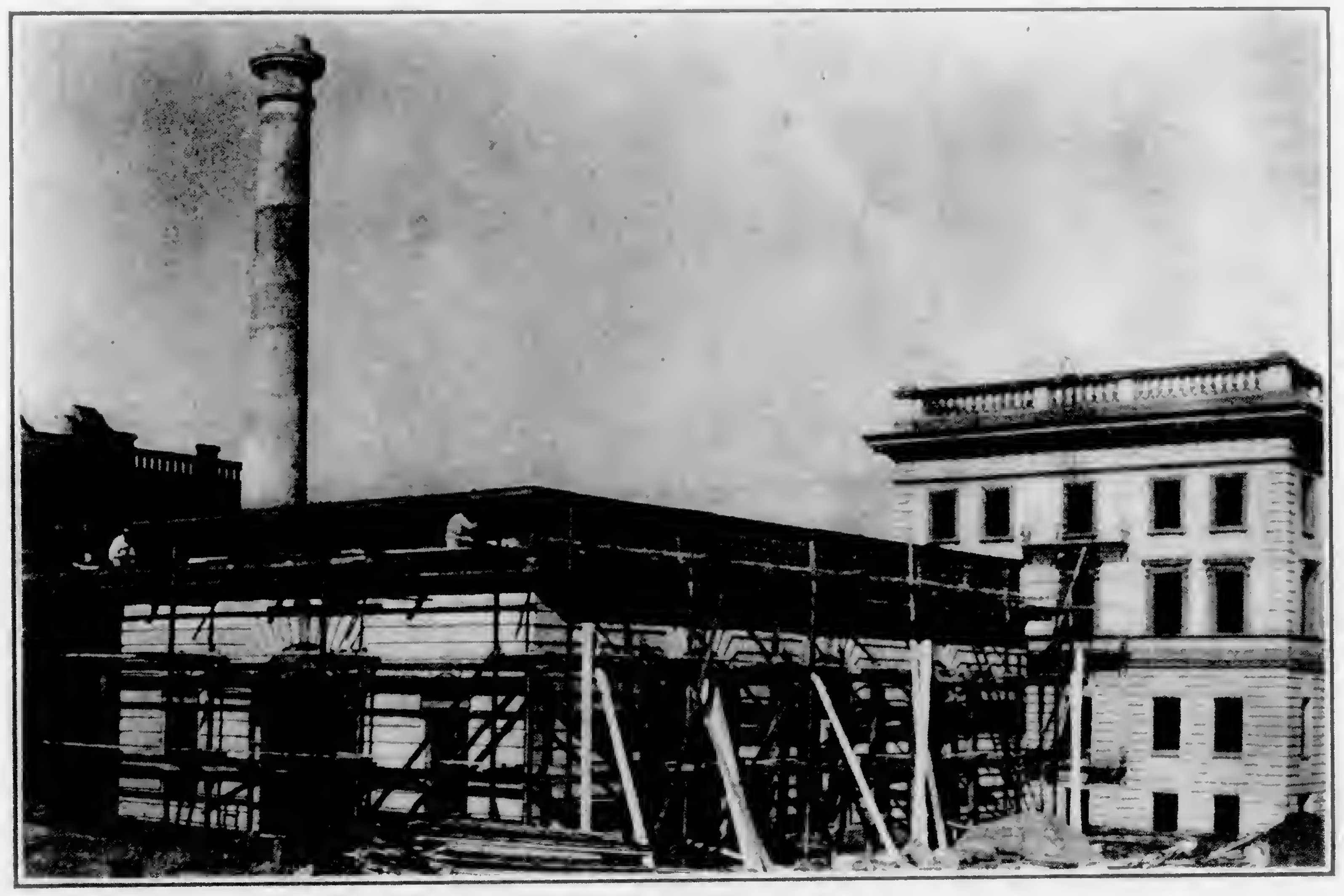

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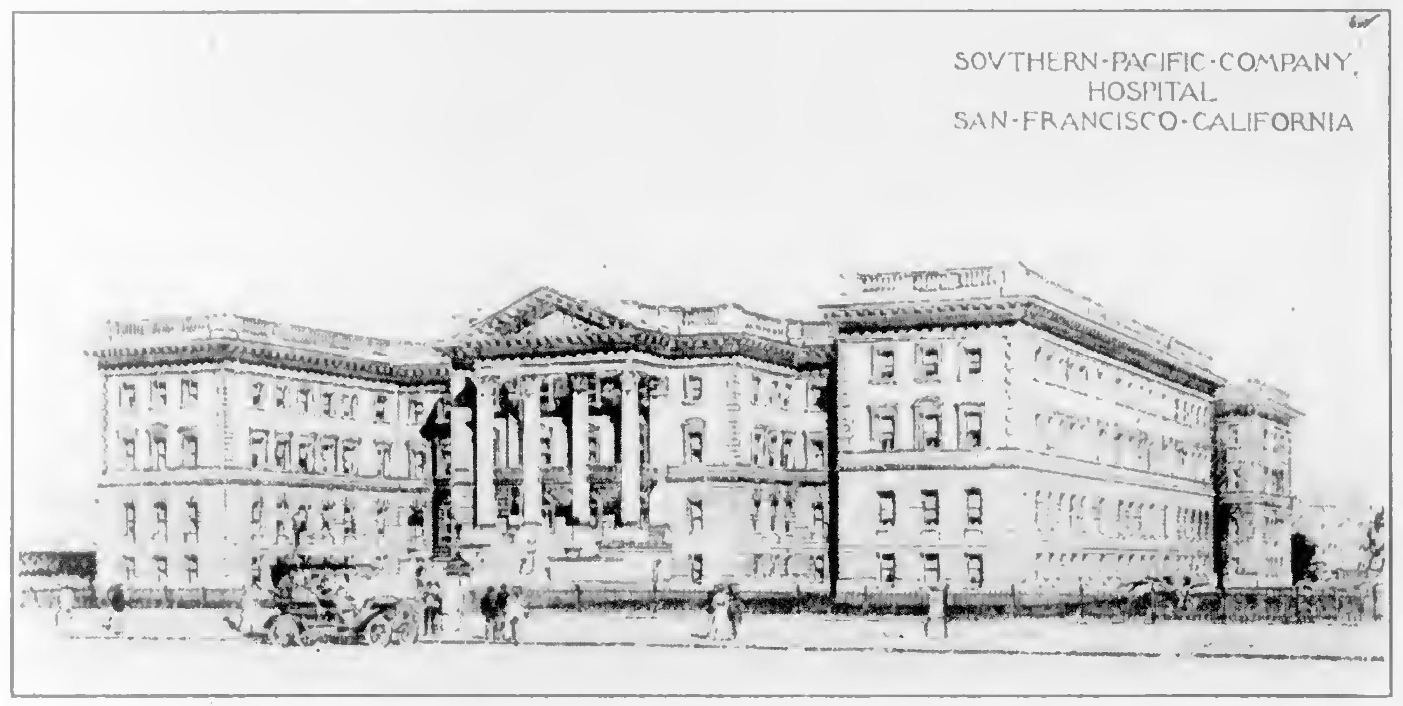
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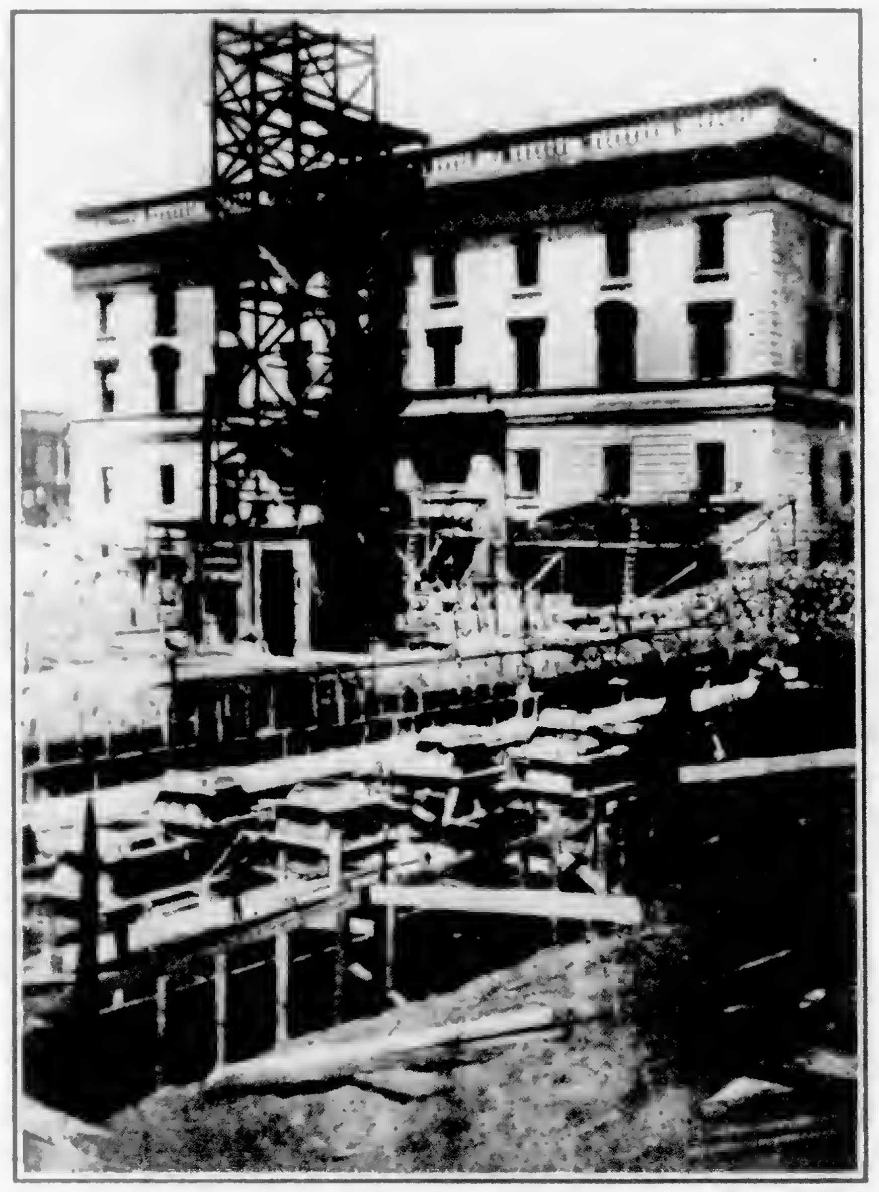

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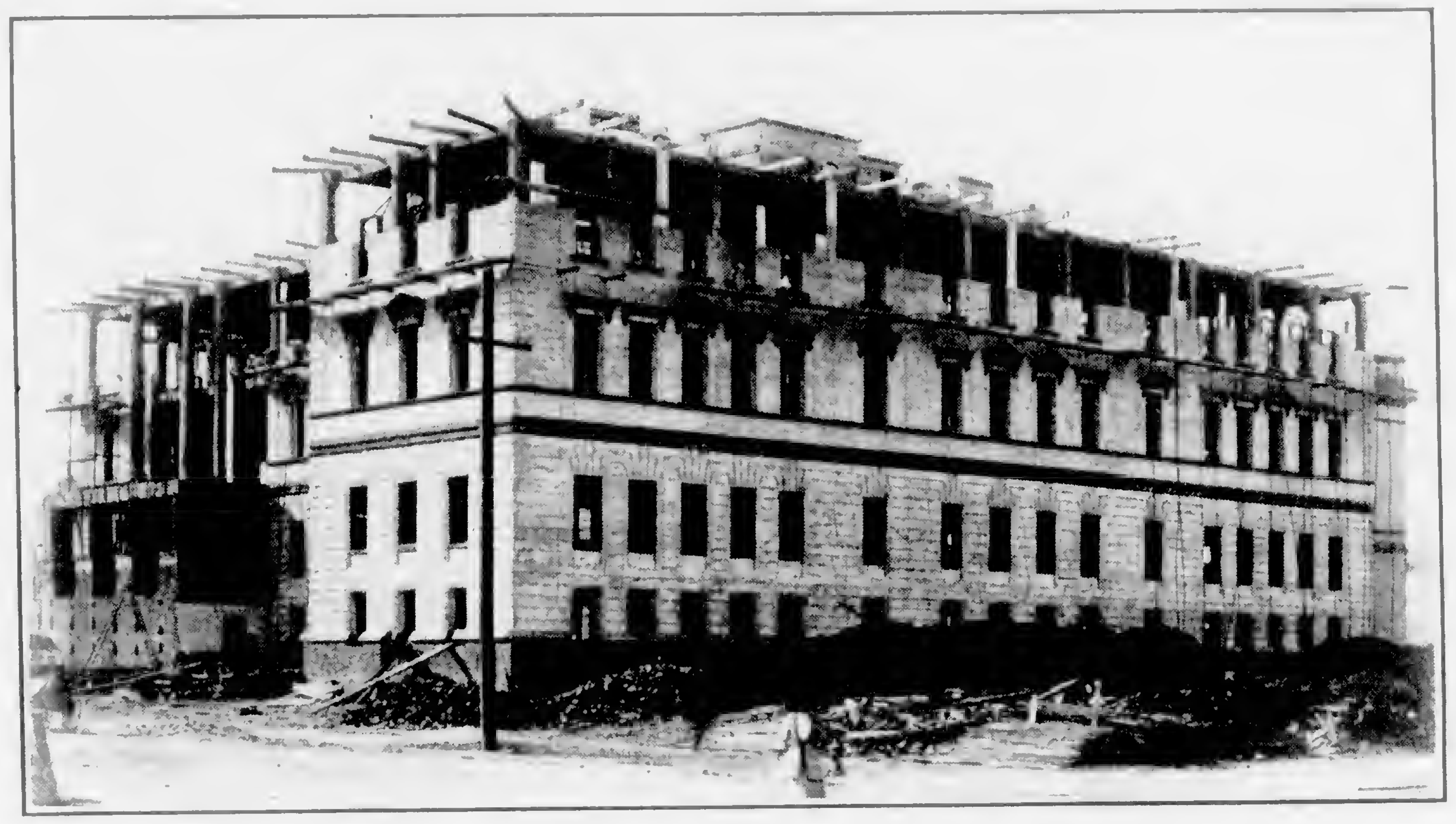

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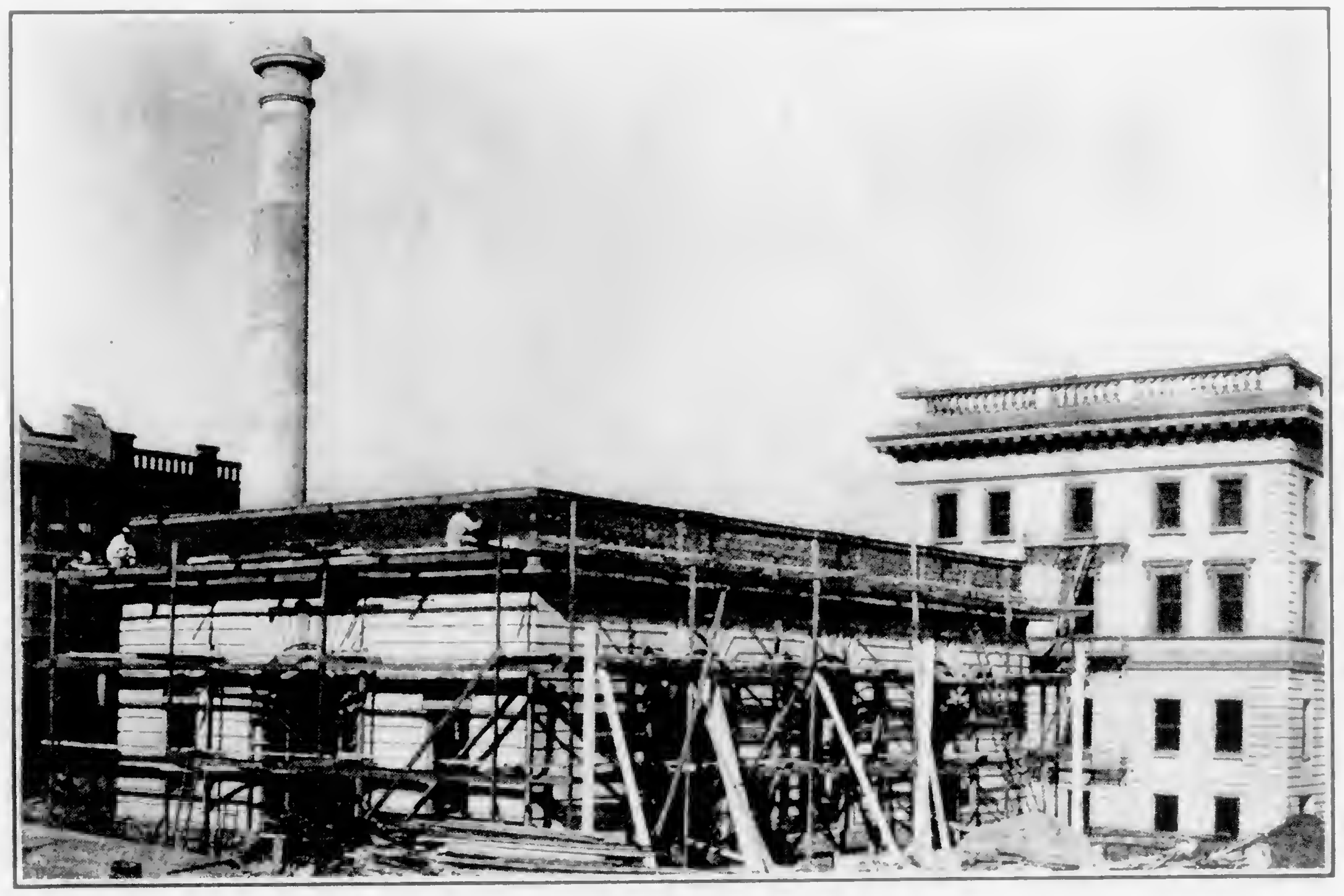


Progress Work, Southern Pacific Hospital, San Francisco

THE TILLMAN & BENDEL BUILDING

Healy-Tibbitts Construction Co.,
Contractors

SAN FRANCISCO

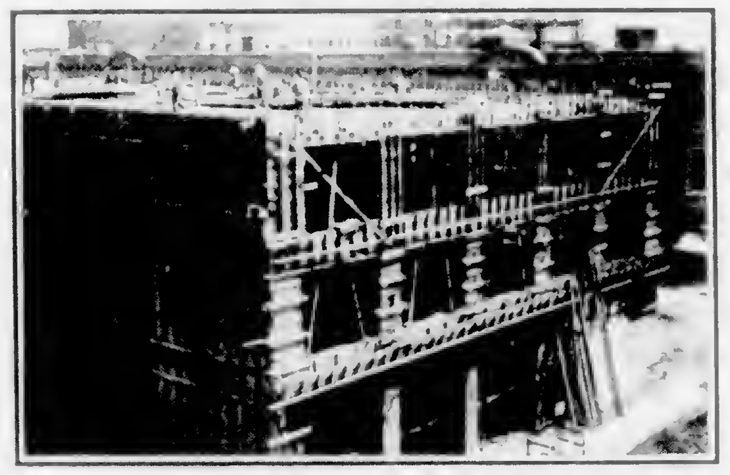
MacDonald & Applegarth,
Architects

The Illustrations Show Progress Work on the Building From April 2, 1908 When Excavating for the Foundation was Begun till August 17, '08 When the Building was Completed and Accepted by the Owners.

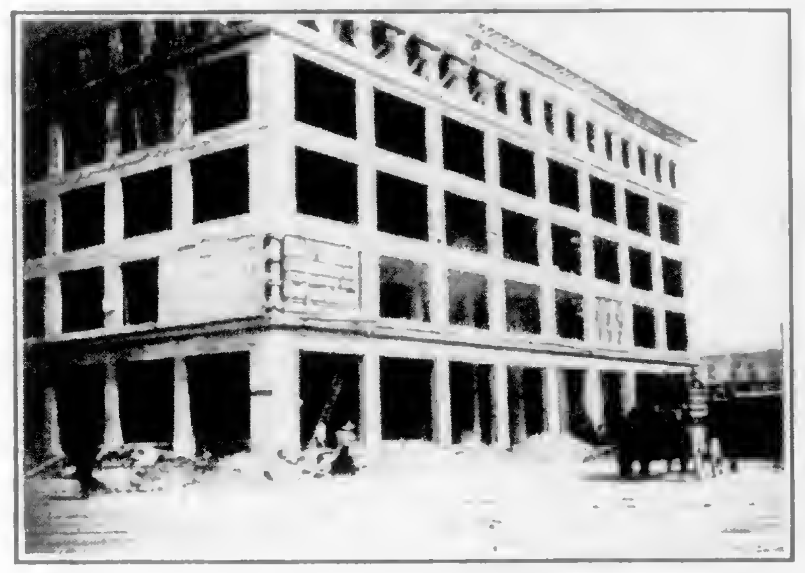
Site, March 16, 1908

Excavating, April 2, 1908

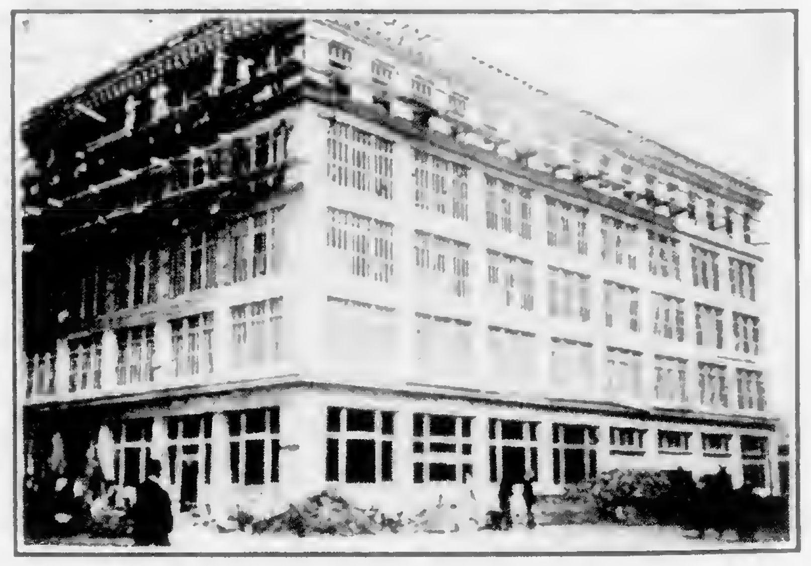
Laying Foundations, April 16, 1908



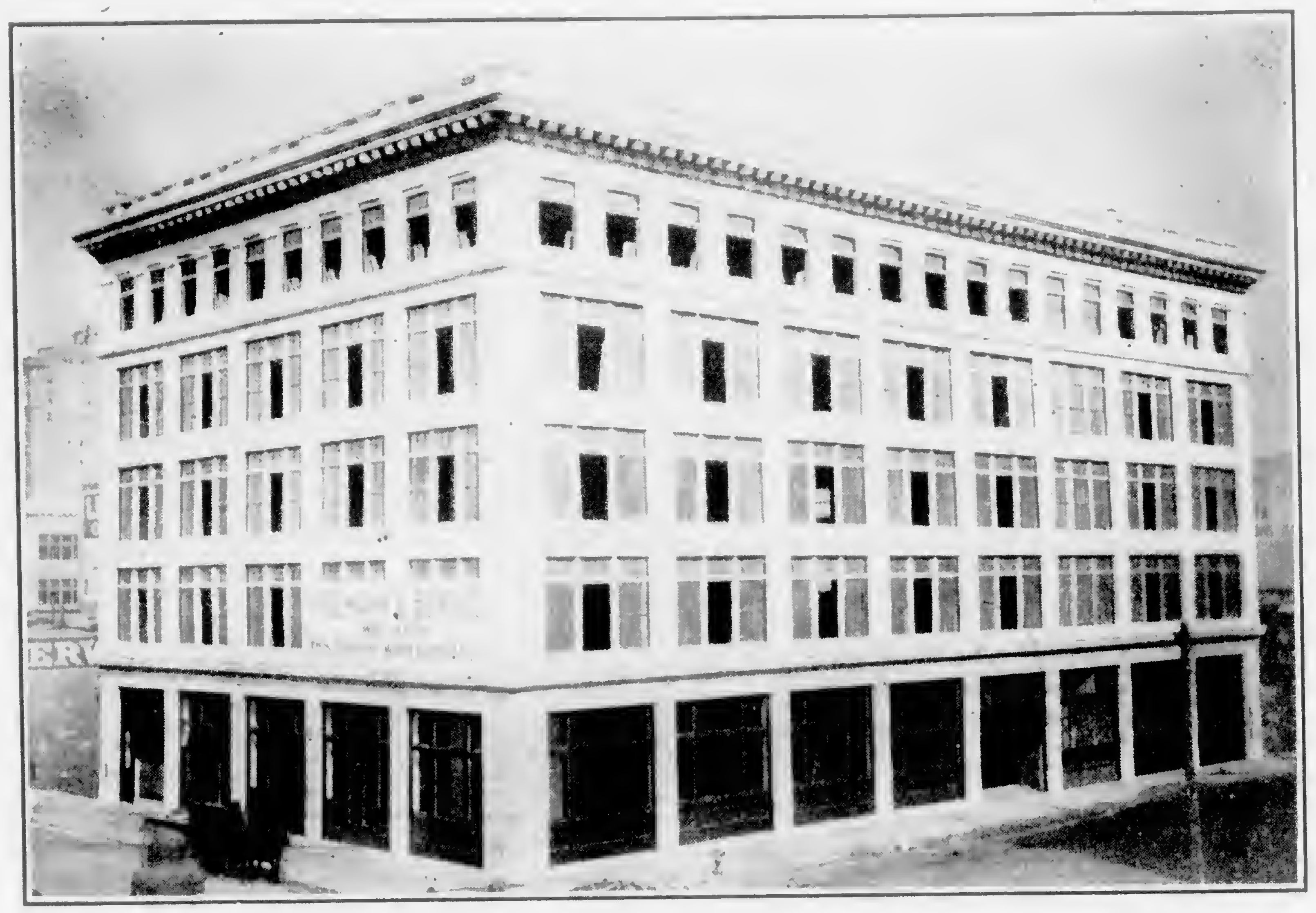
Concrete Forms, May 20, 1908



Removal of Forms, June 17, 1908



Cementing Exterior, July 10, 1908



Tillmann & Bendel Building from a Photograph Taken August 17, 1908
Equipped with Otis Elevators

View Showing Interior Fireproofing in Adam Grant Building, San Francisco

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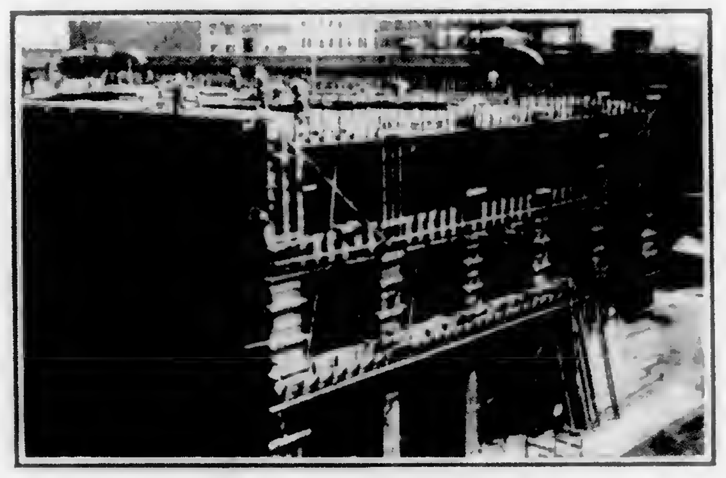
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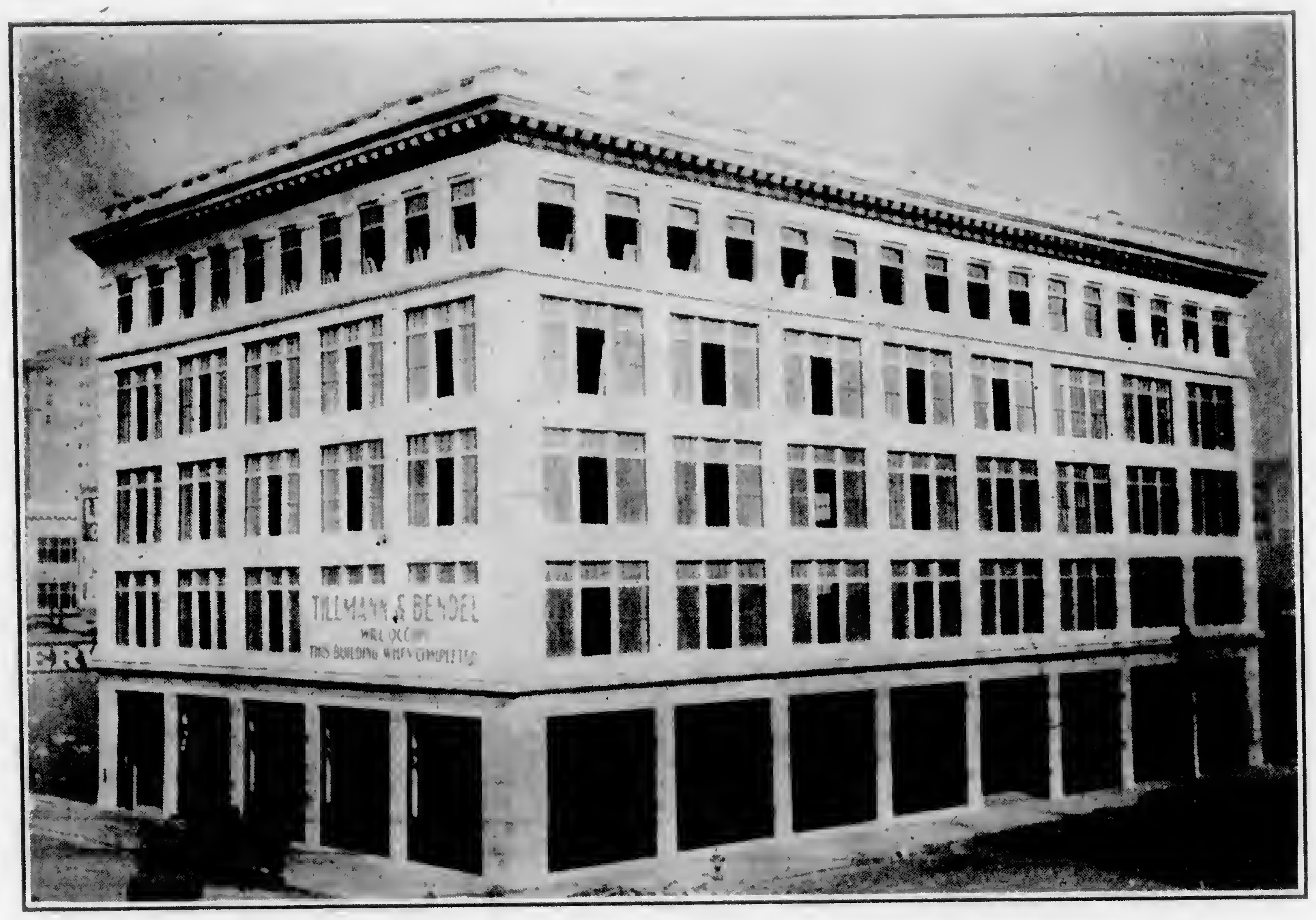

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Quarries of the Healy-Tibbitts Construction Company at Point Molate, on the Contra Costa County Shore of San Francisco Bay

Amongst other deep water and extensive construction work carried to a successful completion by this company are the great terminals of the Western Pacific Railway at Oakland, in which thousands of piles and millions of feet of lumber were used, together with over two million cubic yards of earth and rock filling; the state piers, Nos. 42 and 44, the largest on the water front of the city; the Government jetty at San Diego; the Point Concepcion lighthouse and station; the extensive plant of the Santa Cruz Portland Cement Company at Santa Cruz, the largest producer of that indispensable commodity on this coast.

Two years ago the company cut out over half a million cubic yards of earth and graded the site of the great Guggenheim smelters at South San Francisco in less than three months. This they were able to do with the aid of their huge steam shovel equipment.

The plant of the Western Gypsum Company at Reno, Nevada, was recently finished by the Healy-Tibbitts Construction Company. The Key Route pier, the longest and probably the most substantial trestle of its kind in the world, was built by this company a few years ago.

In the city, the splendid McCreery building, at Davis and Pine streets, a monolithic reinforced concrete structure of five stories, is one of their most recent, and by them is considered one of their best productions.

In New San Francisco the Healy-Tibbitts Construction Company has built the following buildings: The McCreery, the Morbio, the White garage, the Baker & Hamilton warehouses, the Barneson-Hibbard warehouses. They have built the foundations or done all the fireproofing—walls and floors—of the following: The Phelan, the Gunst, the Barron, the Drexler, the Fuller, the Hobart, the Hollis, the Hyman, the Murphy-Grant, the Levi Strauss, the Palace Hotel, the Security, the Bank of California, the Fife, the Boyd, the Southern Pacific Hospital, the Marvin buildings. These are high class fireproof structures and long after the builders have passed away, these structures will remain to speak for the honesty and intelligence of the contractors in carrying out the plans of the clever architects who designed them. The architect may plan to perfection, but if his builder is unqualified, dishonest, even his carefully drawn plans may fail.

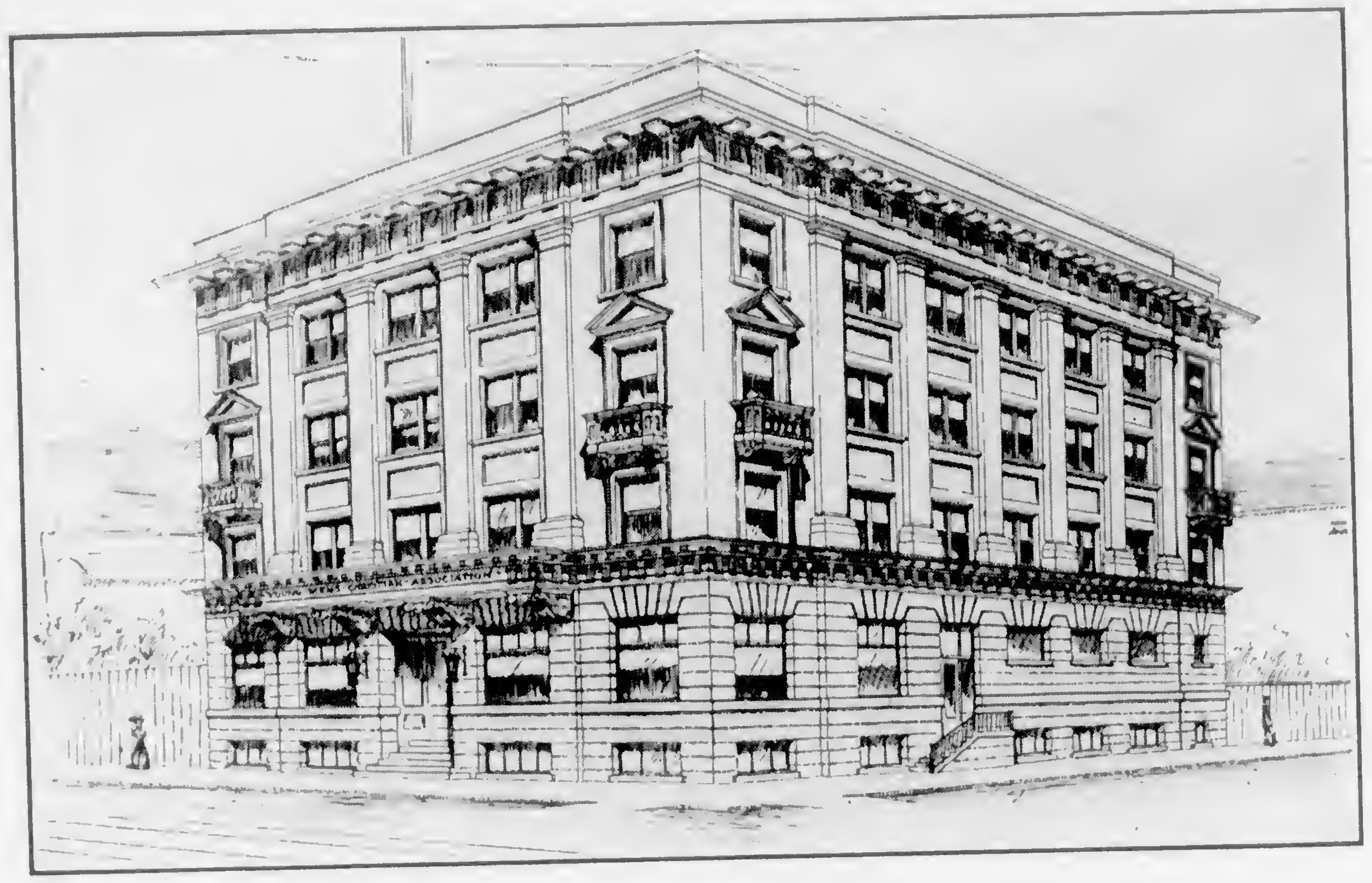
* * *

Anxious

"I feel uneasy about my money."

"Why, I didn't know you had any."

"I haven't. That's the reason I feel uneasy."—Nashville American.



Y. M. C.
Building,
Stockton.

Walter King,
Architect.

Ornamental Plaster Work

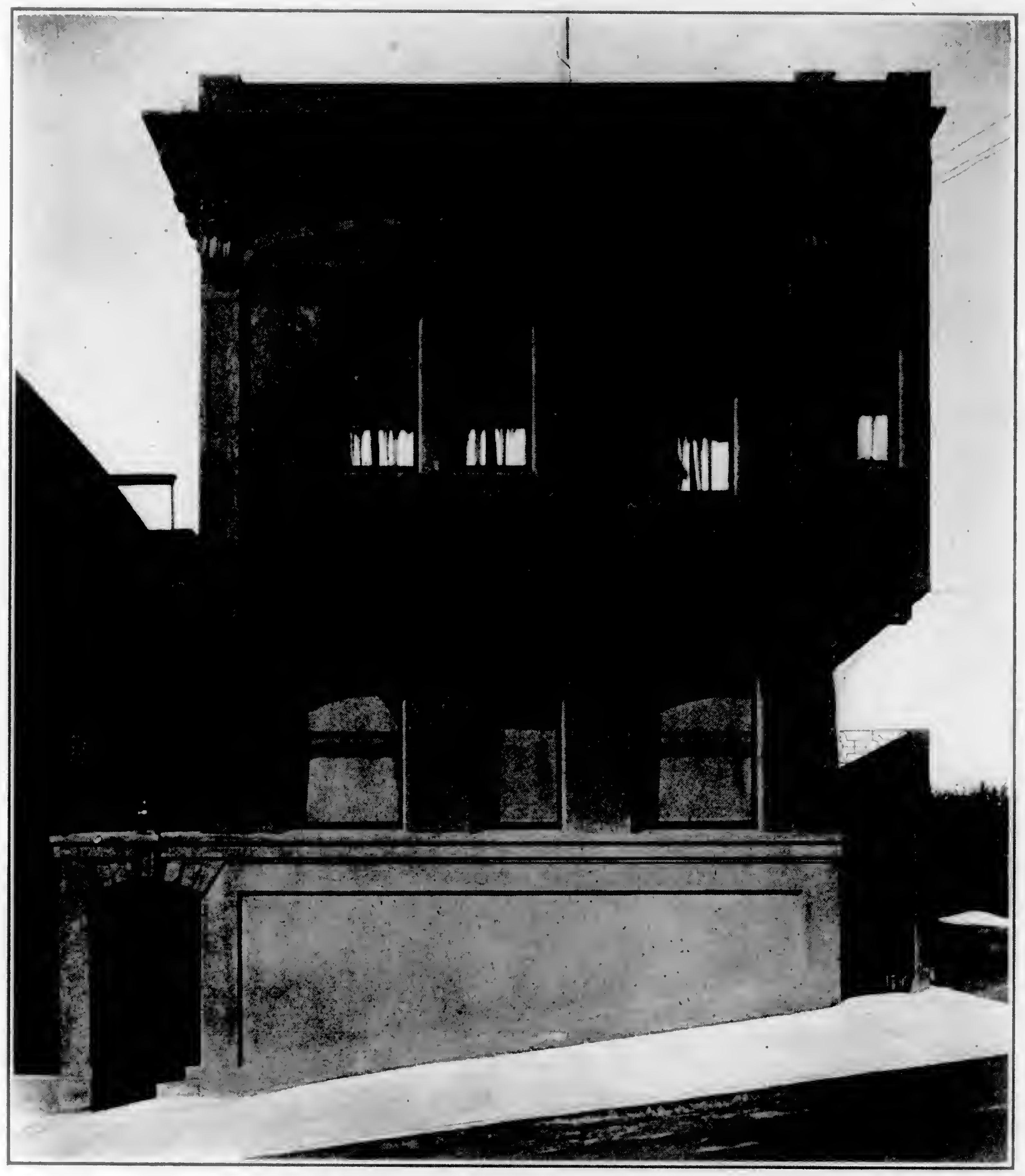
D. Ross Clarke

Of THE several prominent contractors of cement and ornamental plaster work in San Francisco, probably none has received greater recognition in the rebuilding of the city than D. Ross Clarke, whose work may be seen in some of the best buildings erected since the big fire. One of the first contracts which Mr. Clarke took following the earthquake was the interior and exterior plastering of the Flannery building at the gore of Market, Geary and Kearny streets. This five story structure was not only the first new office building in the business center of the city to be completed after the fire, but it was the first reinforced concrete building of any size to go up after the big conflagration.

In Kilborn & Hayden's Ferry Cafe may be seen some artistic staff and stucco work by Mr. Clarke. In the Aronson building at Third and Mission streets a very handsome ceiling in the German renaissance style was executed by Mr. Clarke.

On Jones, near California street, is the residence of General Samuel W. Backus, which was the first reinforced concrete residence to be built in San Francisco. The interior is plastered over expanded metal lath, while the exterior is of cement plaster. The Fisher residence on Washington street, San Francisco, is a study of Pueblo Indian adobe and is done in Portland cement. It is practically a reinforced concrete building. The exterior walls have a cement covering of three and one-half inches.

The Pacific States Telephone building has a very beautiful white exterior finish, the cement work being executed by Mr. Clarke in a manner that has called forth considerable praise. The California Market at Pine, California, Kearny and Montgomery streets, is a reinforced concrete building with a steel and plaster suspended ceiling. The walls and ceiling are beautifully done in snow white plaster.

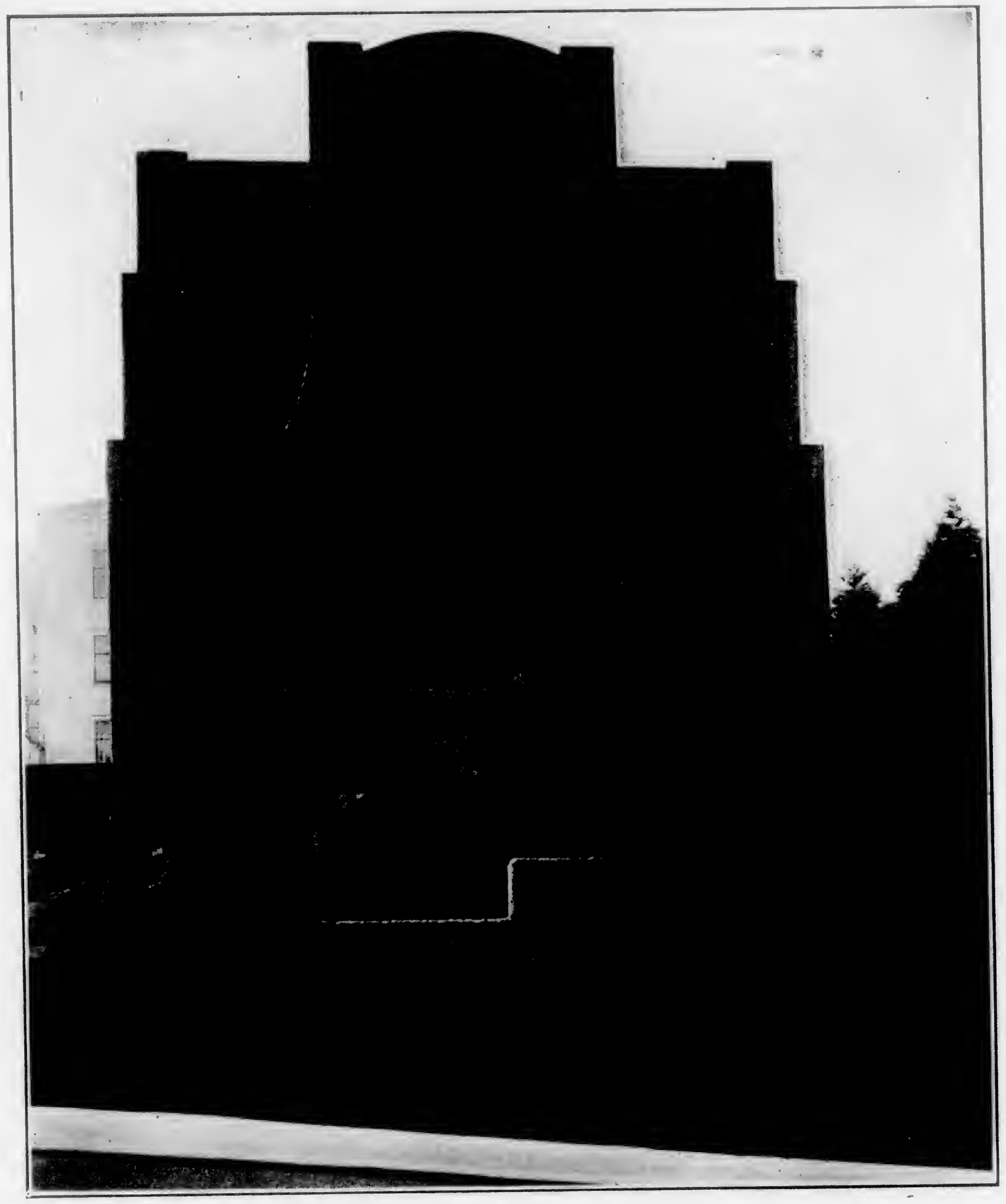


Reinforced Concrete House of General Samuel W. Backus, San Francisco

Concrete and Brick

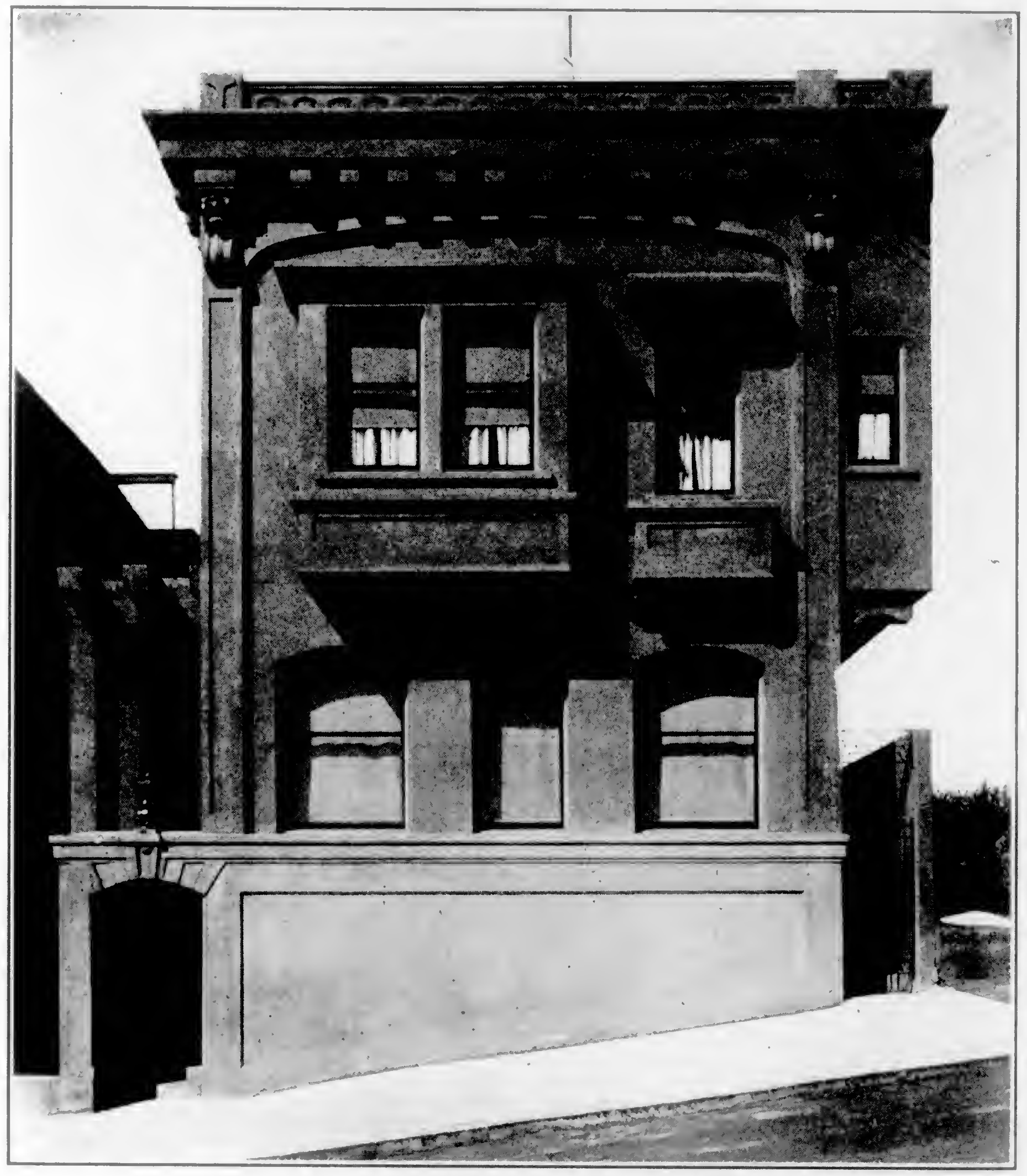
From "MUNICIPAL ENGINEERING."

CERTAIN of the trade papers in the cement and brick fields are amusing their contemporaries and such of the observing public as may chance to see their productions, by the fierce attacks which they are making on each other's materials. They were led by the lurid and picturesque writing of one F. W. Fitzpatrick, a consulting architect, who has long had a bad case of "cementophobia." Some of the cement papers, which are none too solid in their technical departments, have been trying to answer the arguments of the brick men and to find examples of brick failures to offset the cement and concrete failures so gleefully put forward by the brick and tile journals. This tempest in a teapot has no apparent effect upon the progress of concrete, the use of which is extending into new fields every day, as well as expanding in fields already entered.



Residence of Mr. Fisher, San Francisco
Chas. F. Whittlesey, Architect

The facts are that there are equally serious and equally inexcusable failures in the use of both materials. Brick has been in use longer than concrete and the methods of using it should be better understood. Probably the ratio of failures in brick construction is less than in concrete construction, due in part to the more imperfect understanding by the ordinary building contractor, and the ordinary architect, for that matter, of the newer material, and in part to the lack of proper building regulations and expert supervision by building inspection departments of concrete construction. Most of the failures in brick structures are due to bad materials and careless construction, but occasionally one is found which is due to the



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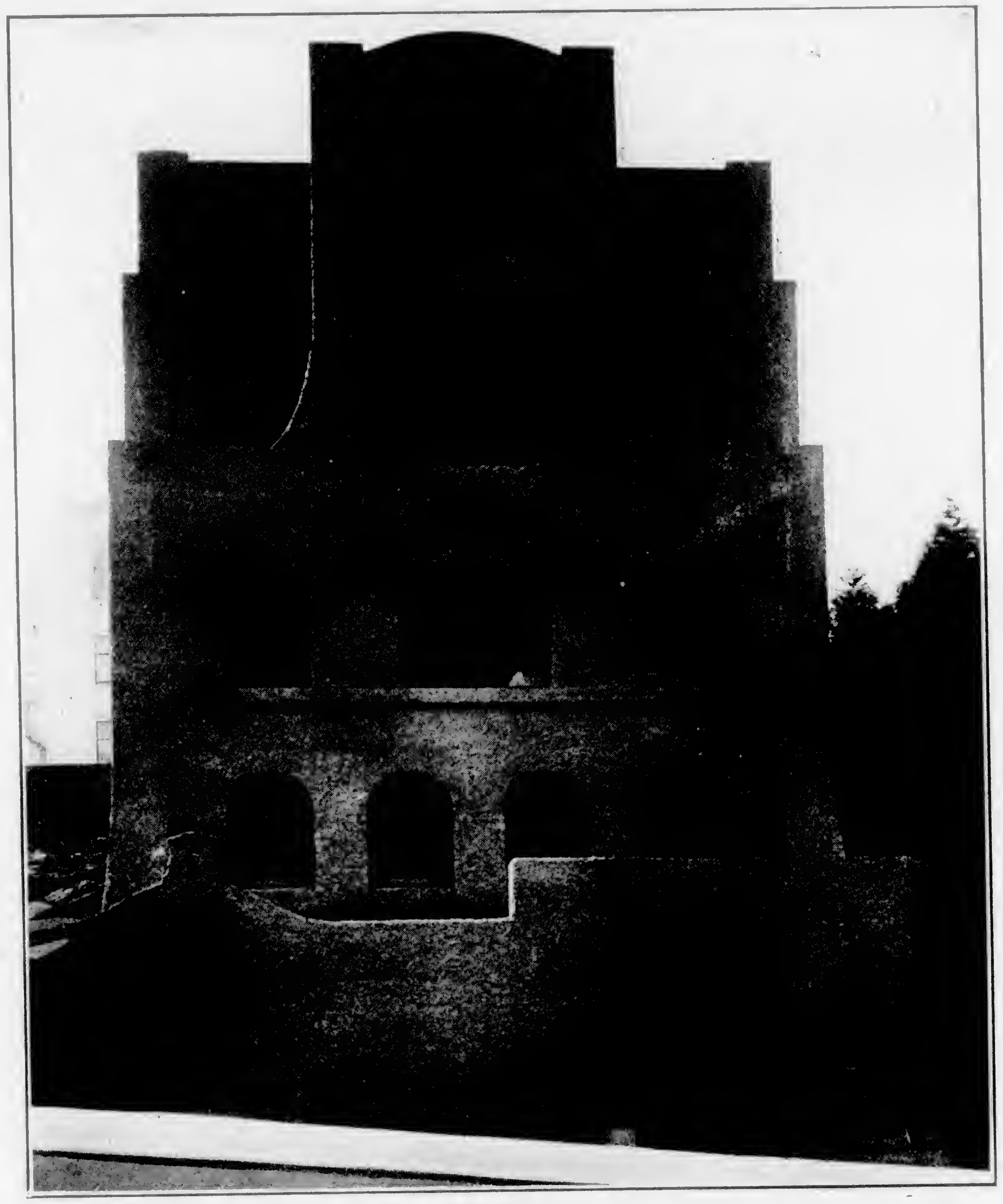

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THE PACIFIC TEL. & TEL. CO.

Building for Pacific States Telephone and Telegraph Company, San Francisco

character of the material. Thus a fire in one brick building which came under the observation of the writer caused the collapse of the whole building, although the extent of the fire was small, through the tipping over of the wall of the upper story by falling roof girders, and subsequent crushing of an adjacent roof and skidding back of the brick against the lower portion of the wall, which then gave way from end to end like a row of bricks set up on end. This was a mechanical result, following the action of the fire, but not due to it, except for the cause of its beginning. A reinforced concrete wall would have acted as a unit and would have been able to resist the initial thrust of the roof girders.

But this article is not intended to enter the lists, but merely to call attention to the futility of the calling of names and to suggest that both sides will find that they are advancing their own causes most effectively by recognizing the good qualities of the other building materials and acknowledging the shortcomings of their own. Combination is always better than contest, especially when each has its own particular field, and only in special cases will one interfere with the other. The fight should be made against misuse of the materials, where it can produce results.

In this connection the following extract from on article by J. J. Moroney, in Brick, will be of interest:

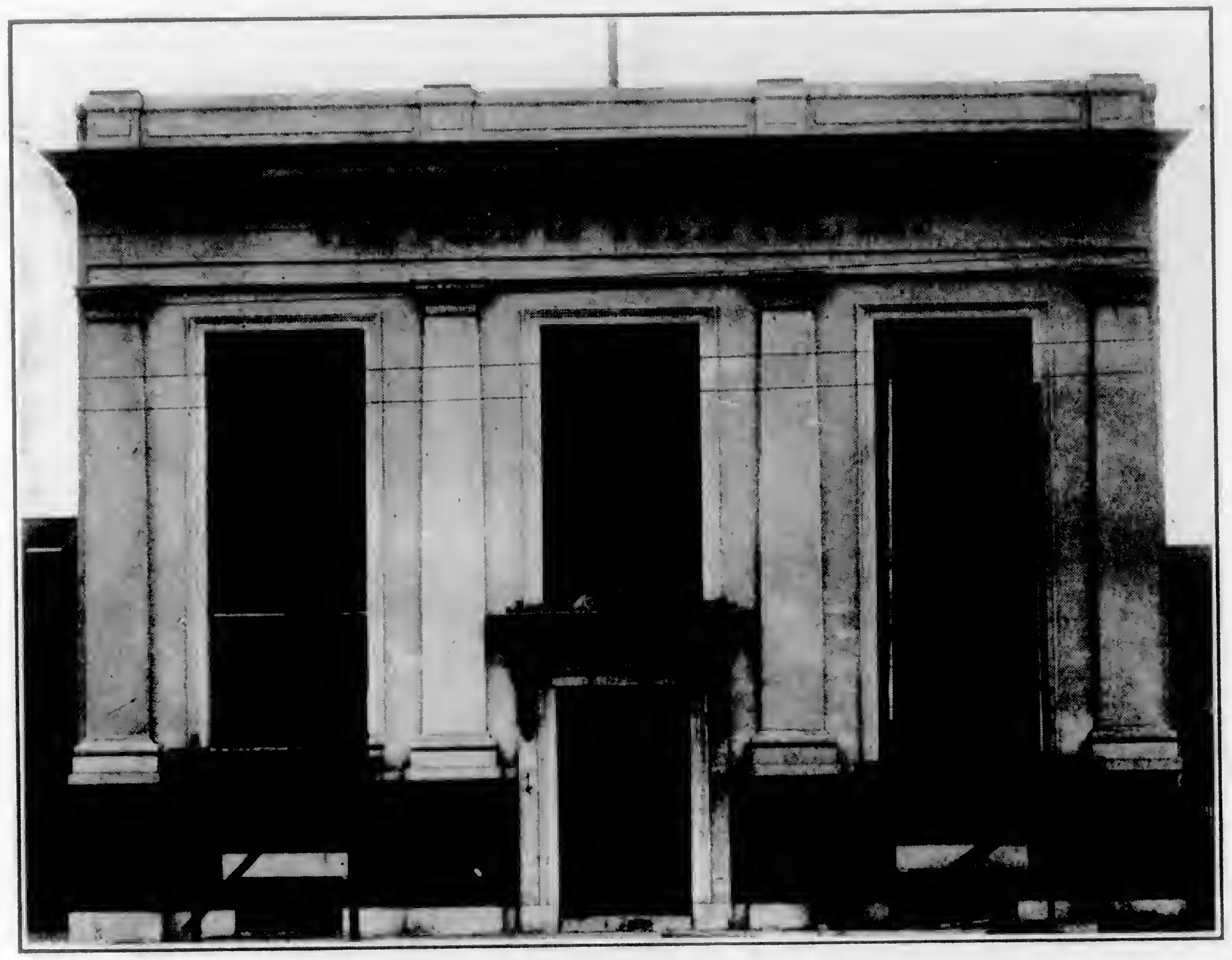
"The average man's idea of brick-making, where he knows anything at all about it, is based on his knowledge of the old-fashioned open yard, where he may have seen, in his childhood days, the tempering wheel, soak pits, and hand-molding gang, and the brick drying in the sun. Of modern brick-making and the up-to-date brick factory absolutely nothing seems to be generally known.

"The concrete industry, though only a few years old, and an infant

Ornamental Ceiling in the Aronson Building, San Francisco
Executed by D. Ross Clarke

beside the brick industry, is much better known. The average business man is familiar to a certain extent with concrete construction, both reinforced and concrete block. One reason for this, undoubtedly, is that concrete has received much more publicity in the papers and magazines; but another reason is that concrete is frequently mixed right on the public streets under the direct observation of the average man; while brick yards are located outside of the beaten track, usually outside of the city limits, and brickmakers are notoriously poor advertisers in their local papers.

"Are we not injuring ourselves and our industry by being too modest, and hiding our light so long under a bushel? Ought we not to come out into the open? My idea of a publicity campaign, however, is not the 'knocking' of our competitors and showing up their weak points, as I don't believe in selling machinery that way, but on its own merits. I do believe, however, that it would be greatly to our advantage, as an industry, to educate the general public in the different methods of making brick, the different qualities of brick made, and the different uses that brick can be put to, so as to make them better judges of brick themselves, and less liable to be



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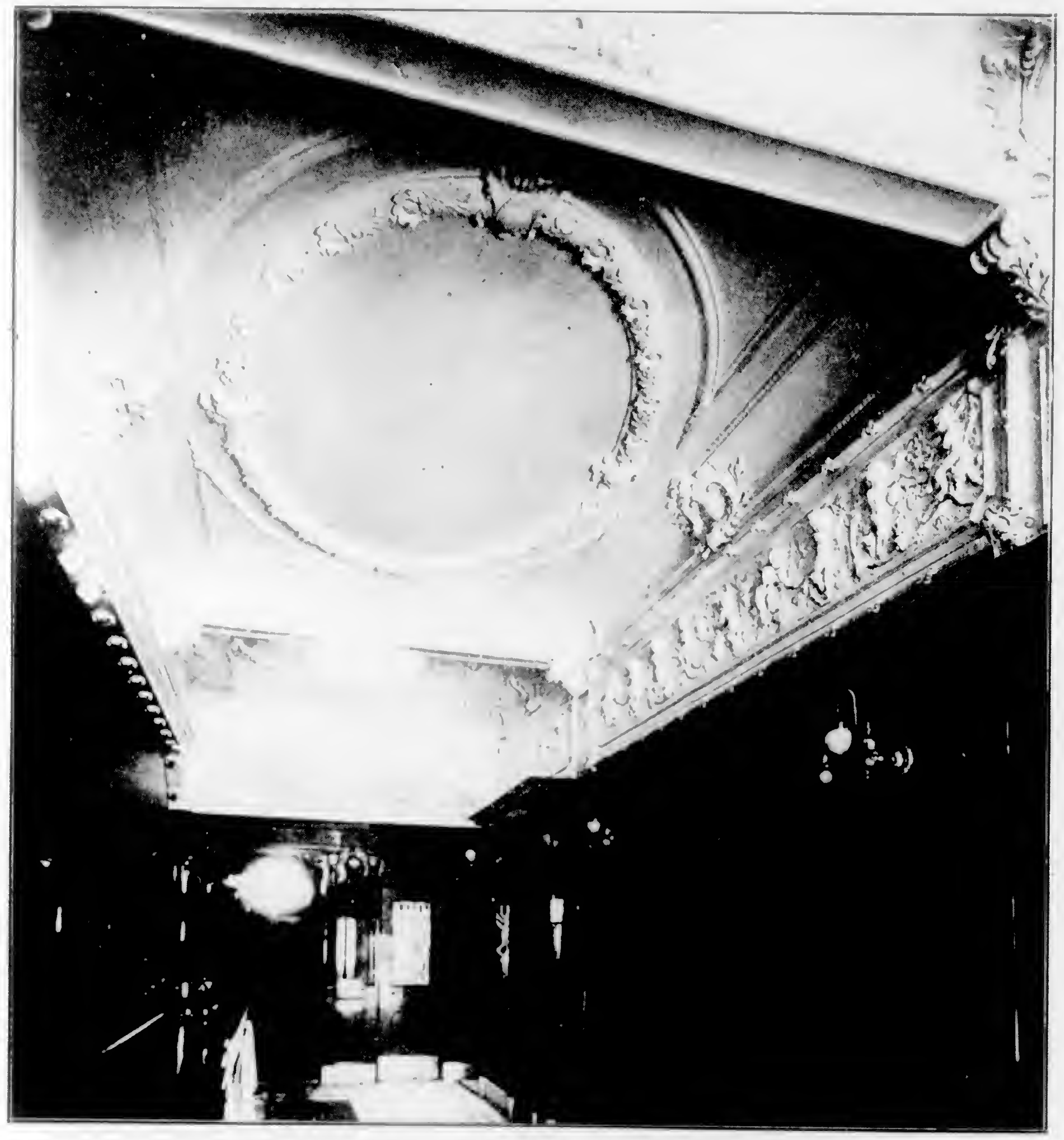
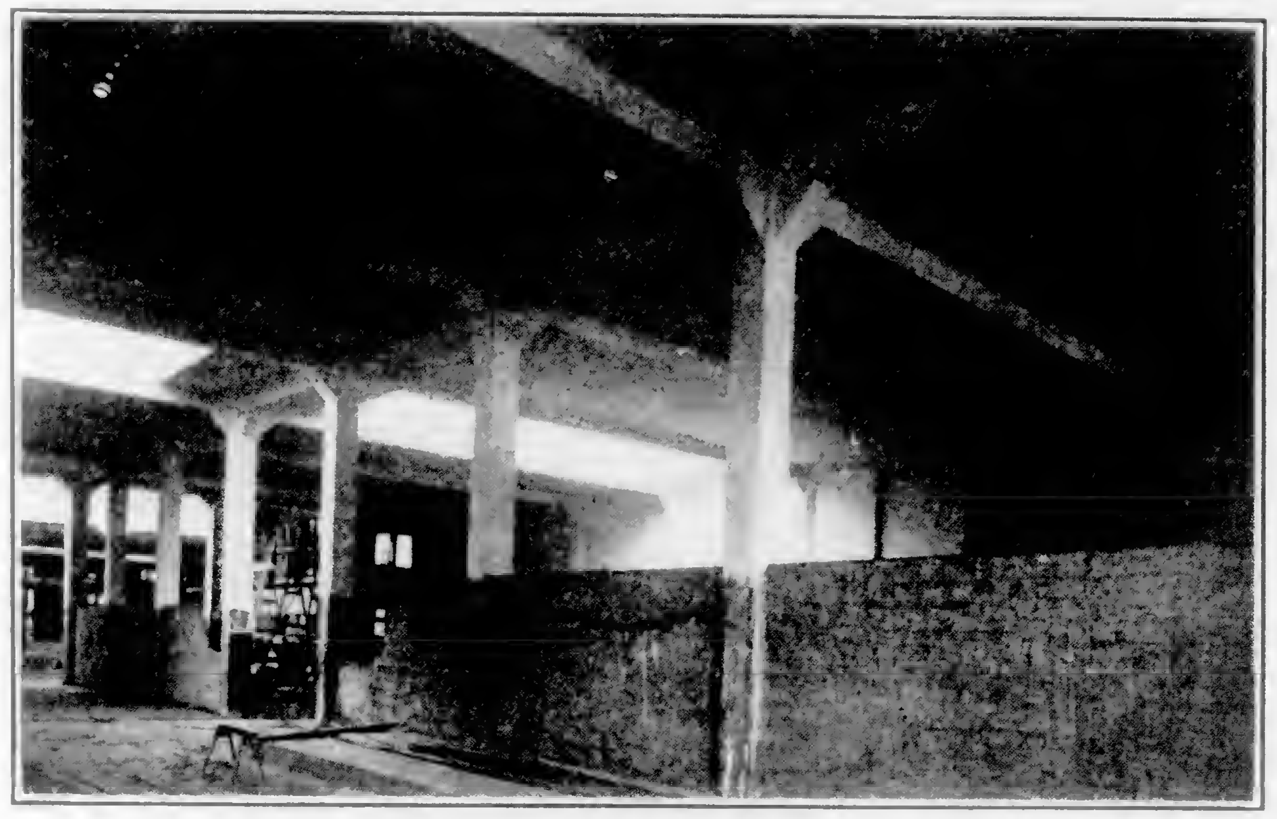
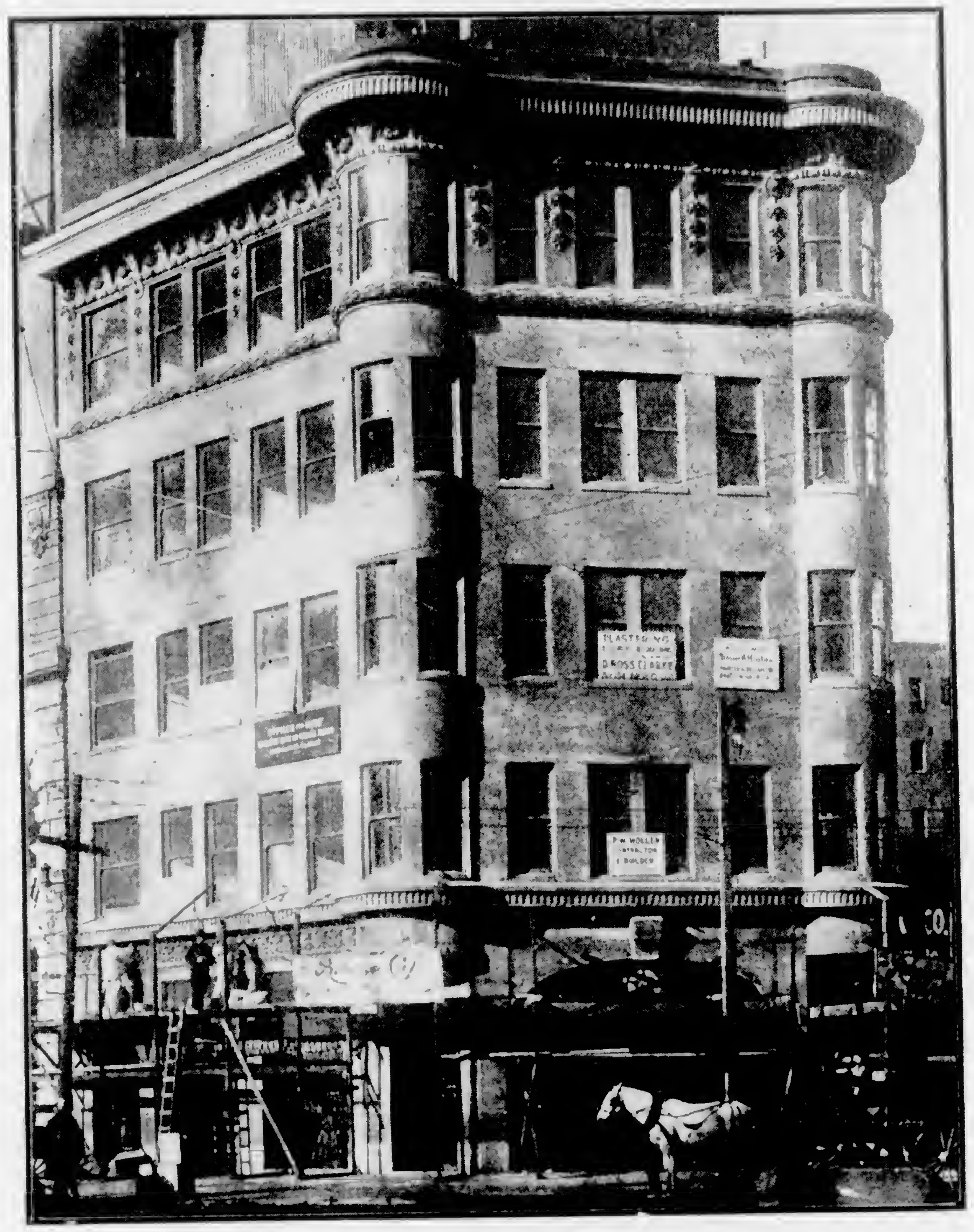


Interior Kilborn & Hayden Restaurant, San Francisco. Ornamental Plaster Work by D. Ross Clarke



Interior California Market, Showing Plaster Work Herman Barth, Architect



Flannery Building, San Francisco
Stone & Smith, Architects

carried away by some new but inferior building material, which is widely advertised. A brick is a brick, and the best of all building materials, whether made by the soft-mud, the stiff-mud or the dry-press process, or last, but not least, by the sand-lime process, which has found its place in the brick trade, and is here to stay."

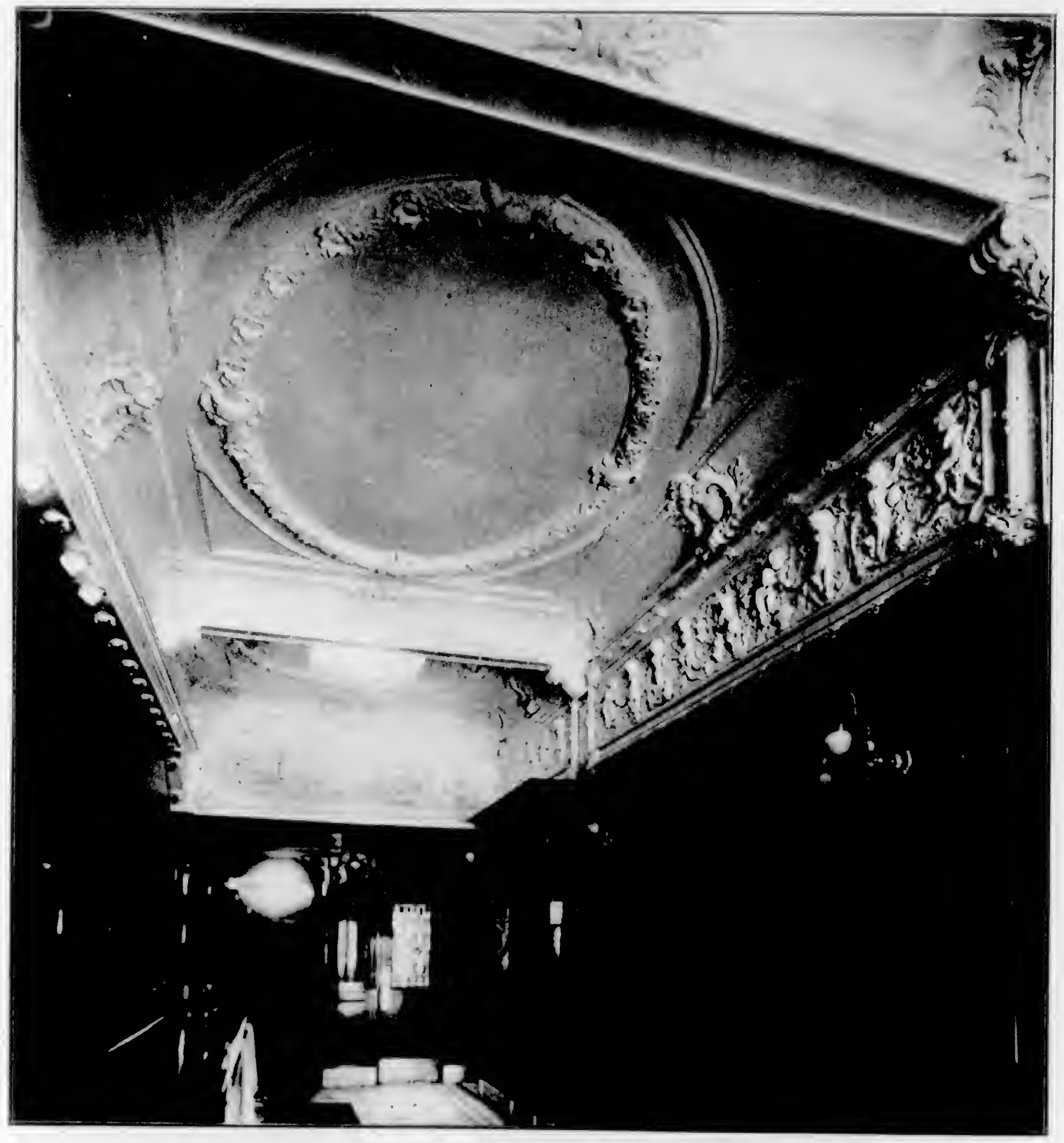
Such an article as this does much to counteract the effect of the rabid anonymous attacks on concrete appearing in the same journal, which, by their evident bias and unfairness really react upon the material which they attempt to defend.

* * *

Why the Lamp Went Out

In the parlor there were three:
Girl, the parlor lamp and he;
Two is company, no doubt
That is why the lamp went out.

—Princeton Tiger.



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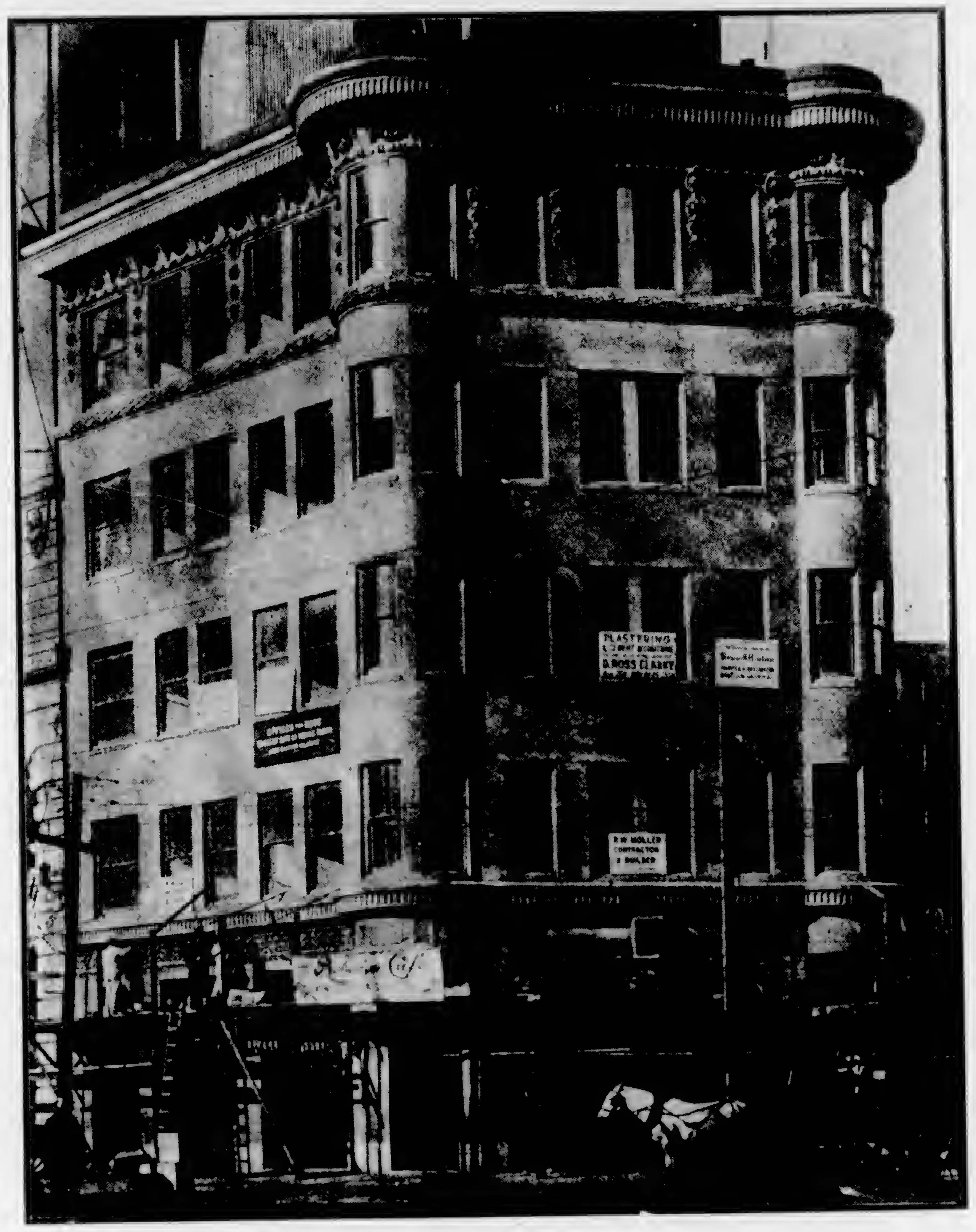

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Architects Criticized by Mill Man

IT IS sometimes interesting to see ourselves as others see us and architects will no doubt be glad of a chance to read what a sash and door representative is reported to have said in conversation with the "Piece Stuff" department of the Mississippi Valley Lumberman.

"We have a whole lot of estimates which have fallen to my lot to figure out," he goes on to say, "and the worst of it is a good many of them are plans prepared by architects. I am not much given to profanity, but I am tempted to use a lot of cuss words every time some of this class of trade comes in. Many of the plans now gotten out by so-called modern architects are prepared by scale and do not have any size marked for windows, doors or any of the detailed work. I would rather have a rough sketch with some of the dimensions marked than all these elaborate drawings by architects. A good many of their specifications are not of a character to materially assist in getting out mill work. With very few exceptions the architects want something just a little different than the regular sizes. Just why they should specify a certain number of windows an inch or so smaller than the stock sizes and the balance of them just that much larger is something I am unable to figure out. There is no doubt but that they add twenty-five per cent or more to the cost for the consumer by insisting upon this class of work.

"A great deal of the moulding and other fancy wood work is made in detail and often calls for a useless waste of a lot of clear lumber. Some years ago we were successful bidders for the mill work in the construction of a number of railway stations. Evidently they had dug up a lot of architect's plans which were prepared years ago. After studying over the detail for some time, I made up my mind that there was an opportunity for a good big saving. Getting the consent of the officials I made entirely new drawings and specifications with the result that we were enabled to put up very much more serviceable and attractive structures and save considerable expense. I explained to the railroad people that on this particular job there would not be very much of the saving but that in the future they could get bids which would be very much less than they could possibly secure with the old plans. Out of that two days' work I saved for the firm over $500 which they would have been obliged to spend had they adhered strictly to the other specifications."

* * *

Details of a "Skyscraper"

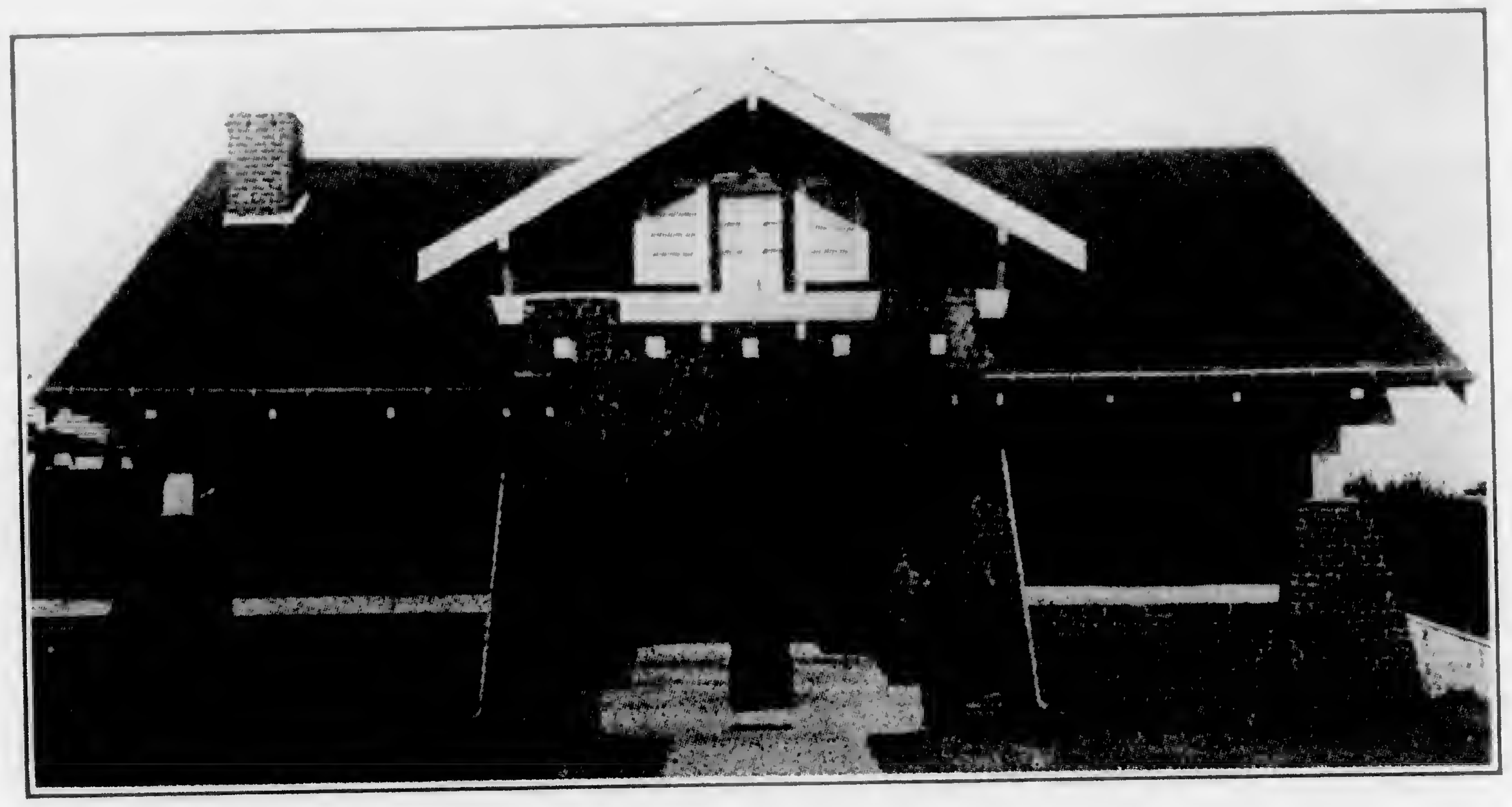
The following figures in connection with the sixty-two story building to be erected in New York City are certainly unusual:

The building is to have a floor space of 1,656,960 square feet, equivalent to forty acres. The entire height from the curb will be 909 feet, or more than three times as high as the Ford building. The plans call for 5200 windows and 4000 radiators.

It is estimated that 480 tons of granite will be needed to carry the building up to the sixth floor, above which the plans call for brick and terra cotta, to the sixty-second story. Figuring that the outside wall will be two and a half feet thick, it will require about 1,500,000,000 bricks. This is enough to build a brick wall ten feet high across the continent separating the United States and Canada.

The plans call for 38 elevators. It will have 16 boilers and 12 engines and generators. The elevators will transport 50,000 persons daily each way. The engines will be sufficient to propel across the Atlantic not only the steamers Lusitania and Mauretania, but the Deutschland and Kaiser Wilhelm as well.

There will be 3600 offices in the building, with a population of about 21,000 persons.



A Brick Bungalow

Some California Bungalow and Residence Interiors

THE bungalow is essentially an open-air dwelling, arranged to give an abundance of ventilation, and made for comfortable living all the year round. It is a one-story cottage, originally modeled after the East Indian dwelling, about which Kipling has so interestingly written.

In warm climates, like that of California, bungalows do not have about them any of the transient air that we find in the summer bungalows in the Adirondacks or the seashore. They are permanent dwellings, and combine the pleasure and charm of the informal summer life of the east with all the stability of character that is needed for a home.

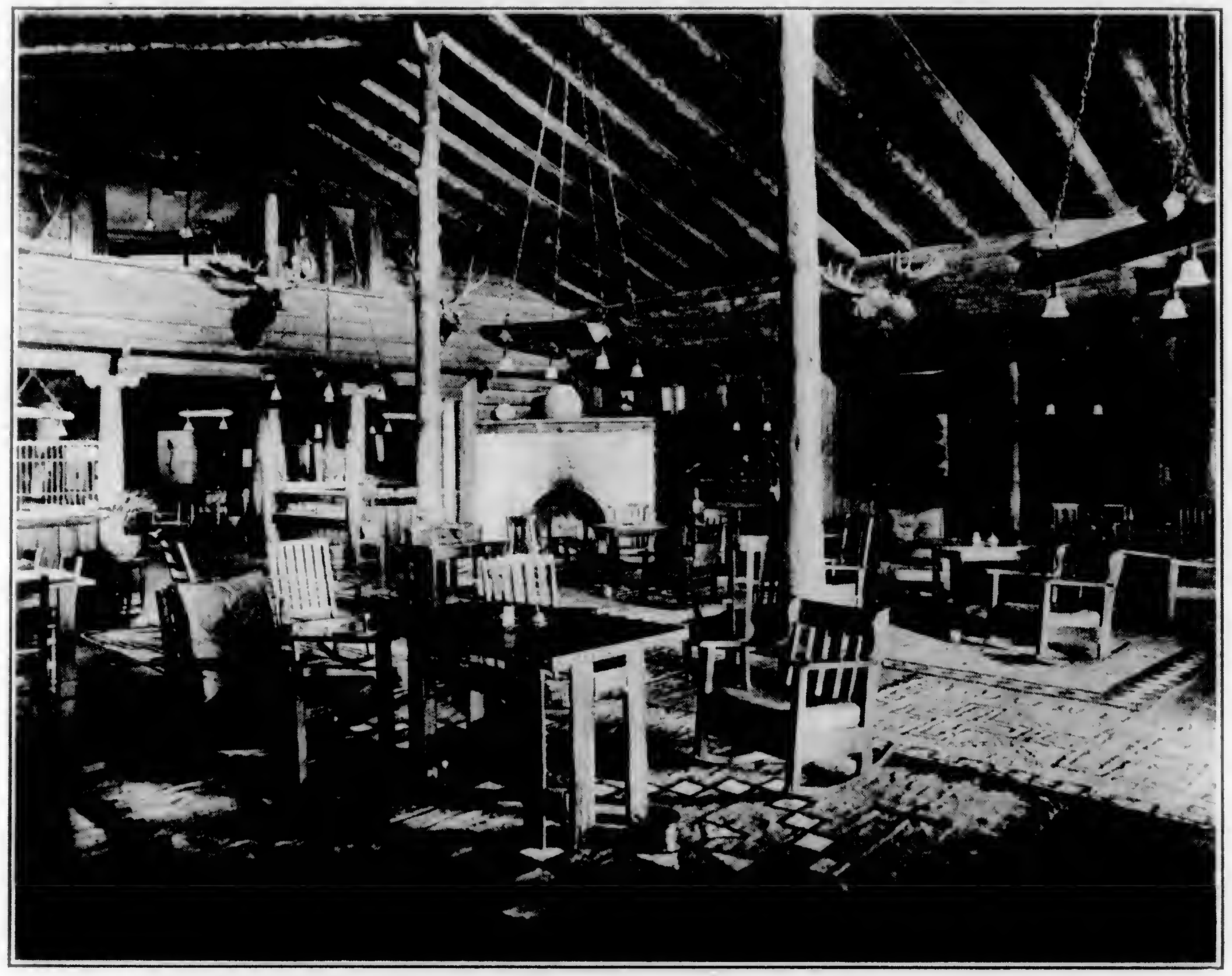
The present inclination in the furnishing of the bungalow is towards plainness and simplicity. As a matter of fact, persons with full pocketbooks are now among the most eager purchasers of draperies, furniture and wall coverings of the plainest description.

Rough finish, brown tones, materials of coarse fiber, woods showing the natural grain, and all absence of paint are greatly in demand, and the splendid examples seen in both the domestic and imported lines of all these articles afford an excellent assortment from which to choose from the standpoint of design, color and texture. Admirable results can be accomplished with but an expenditure of a few thousand dollars.

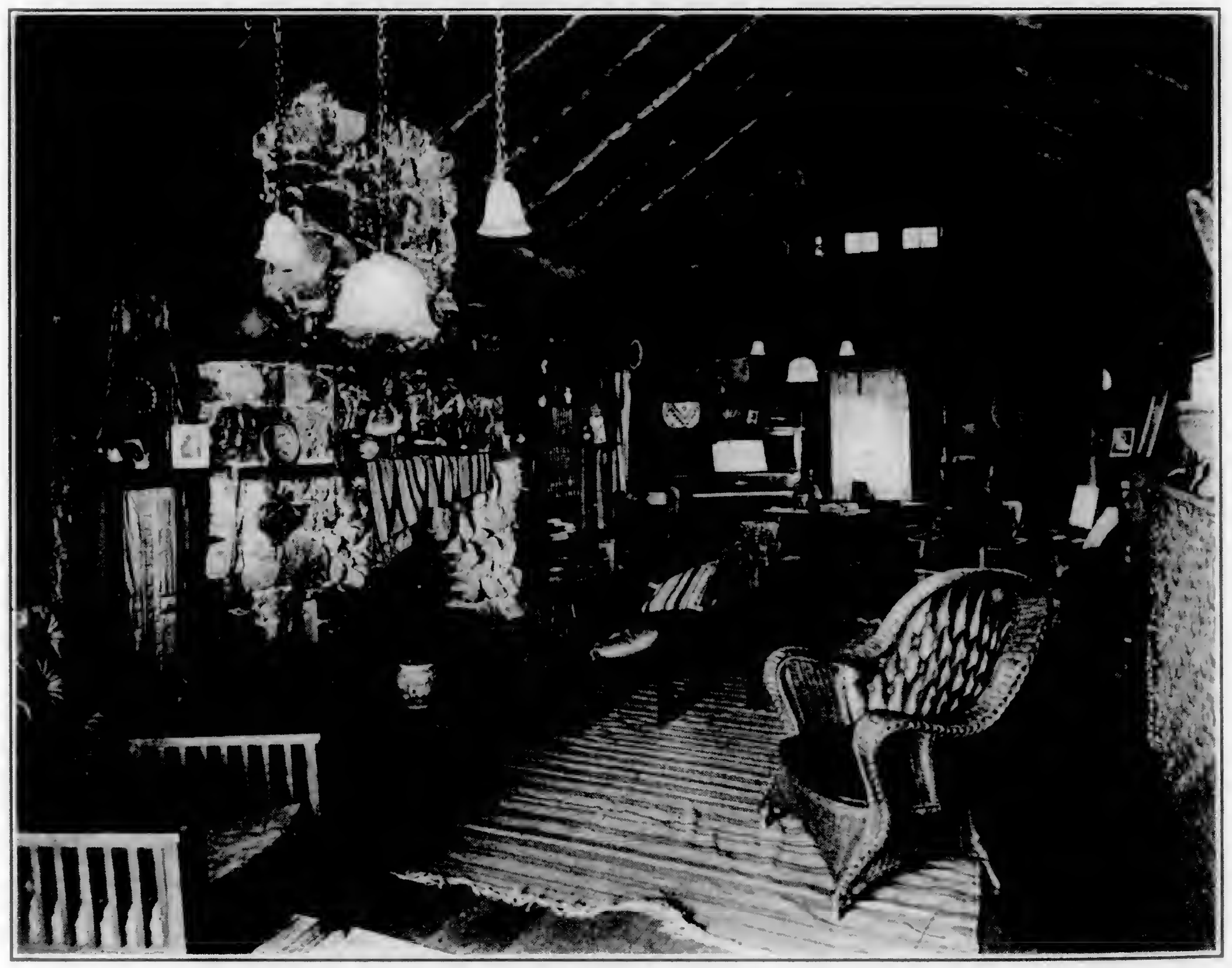
In furnishing the draperies for the windows, one set of hangings is all that is necessary, excluding even the window shade, a short curtain that hangs to the sill, without touching the wood, looks well when it is placed between the casing. If the rod is fastened to the outside of the casing the curtain may hang below the sill as far as the woodwork extends.

Casement windows that open into the room may have the curtain material fastened at the bottom and the top of each window, or if preferred only at the top.

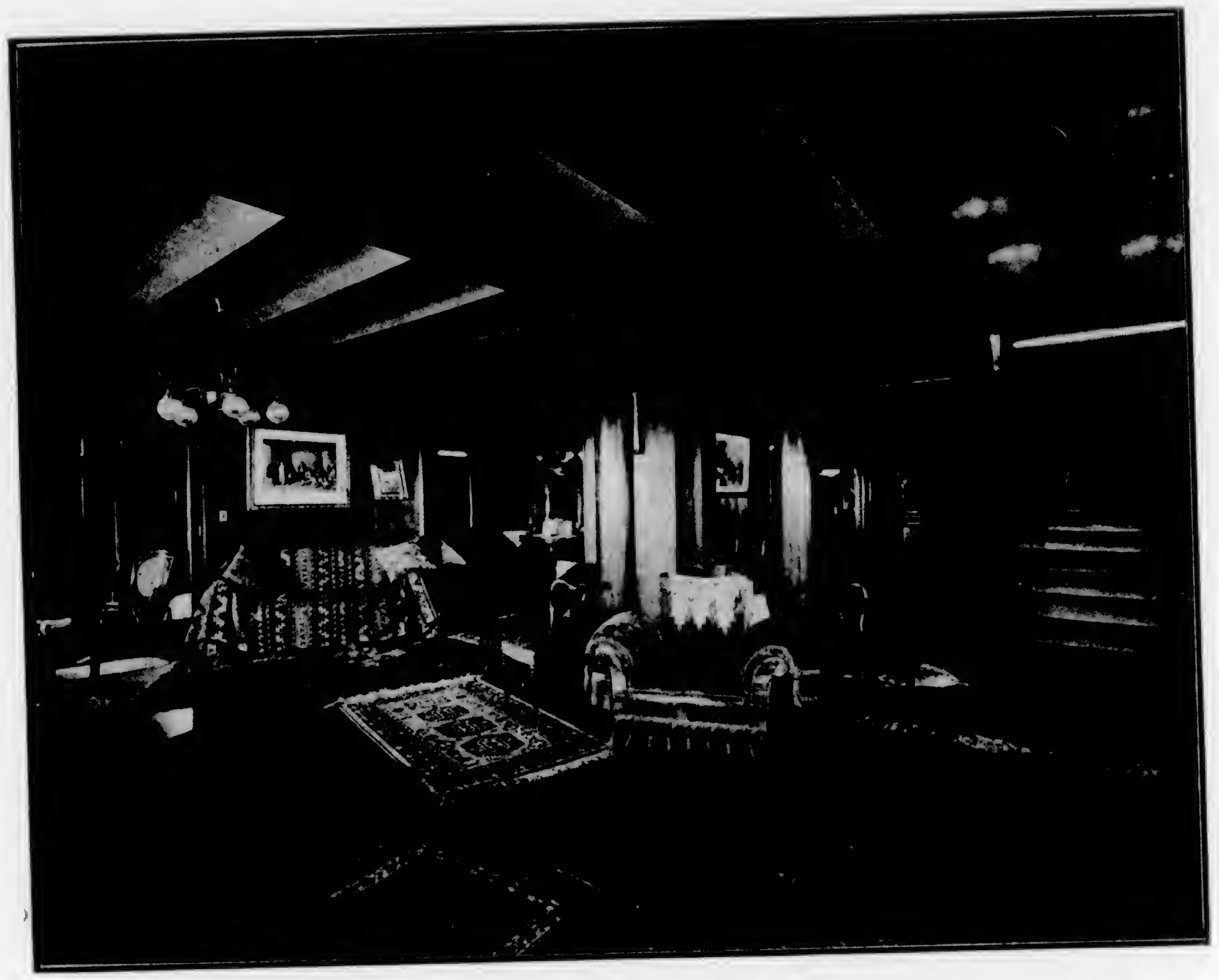
In all the furnishings of the bungalow ample opportunity is afforded for the introduction of color which is well supplied in a large variety of plain materials, linen, linen taffeta, jute, or mercerized cottons. There are also semi-transparent fabrics in coarse meshed nets, in plain and fancy weaves, colored madras and crepe. Many of these curtains are shown in



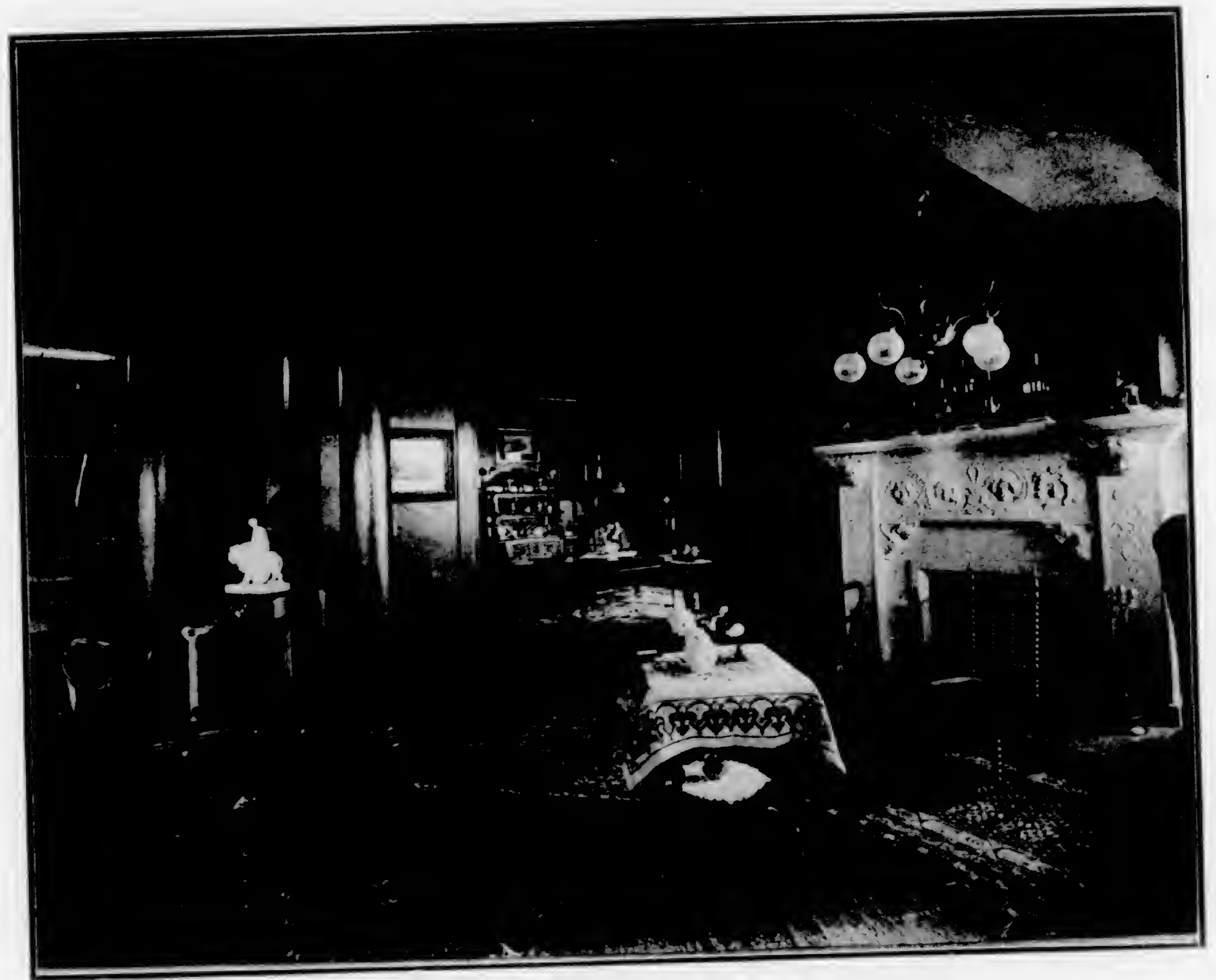
Men's Lounging Room in Hotel El Tovar at Grand Canyon. Chas. F. Whittlesey, Architect



Living Room in Bungalow of C. F. Whittlesey at Albuquerque, N. M. Chas. F. Whittlesey, Architect



Interior House of Mrs. E. A. Preble, New Monterey, Cal.
W. H. Weeks, Architect



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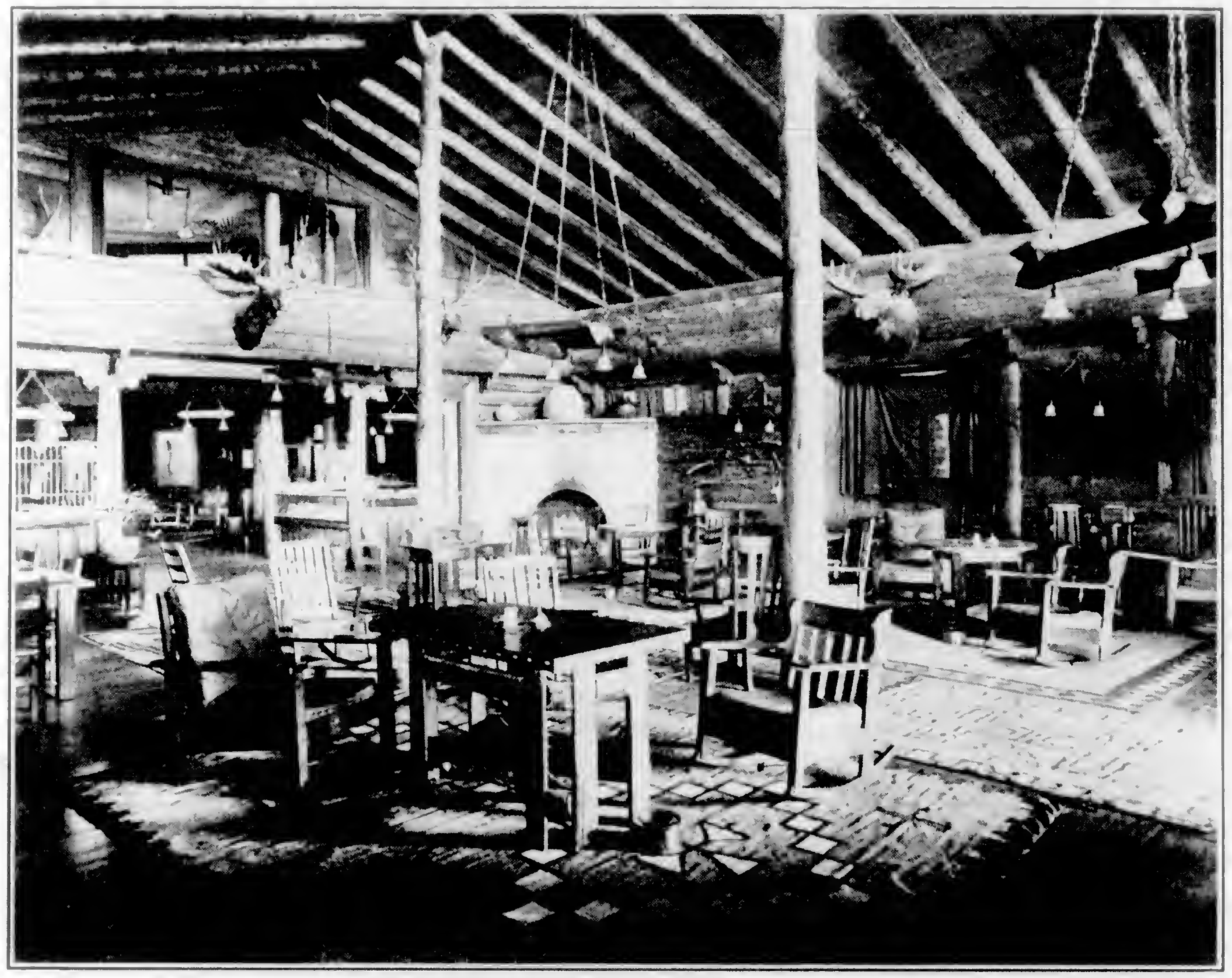

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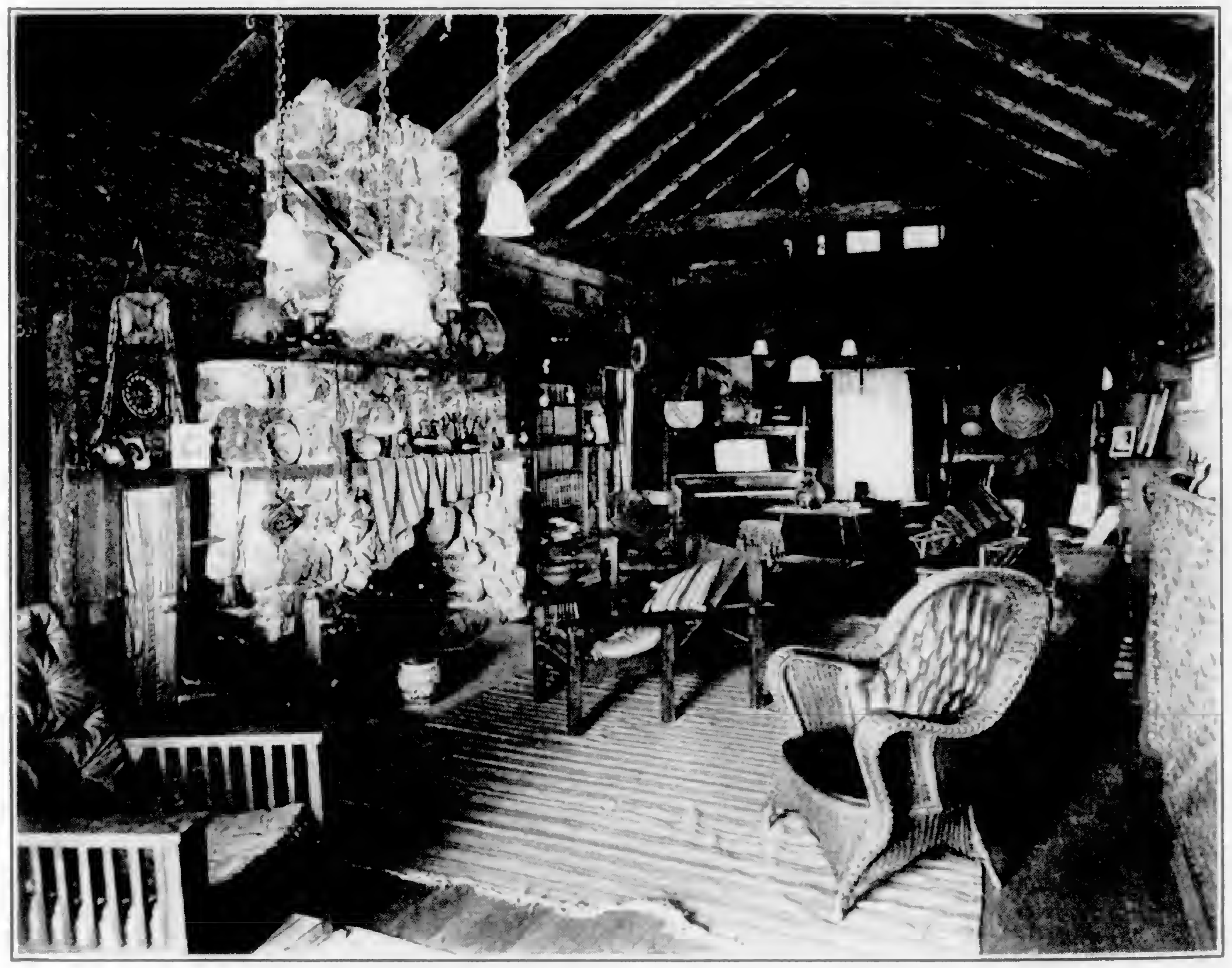

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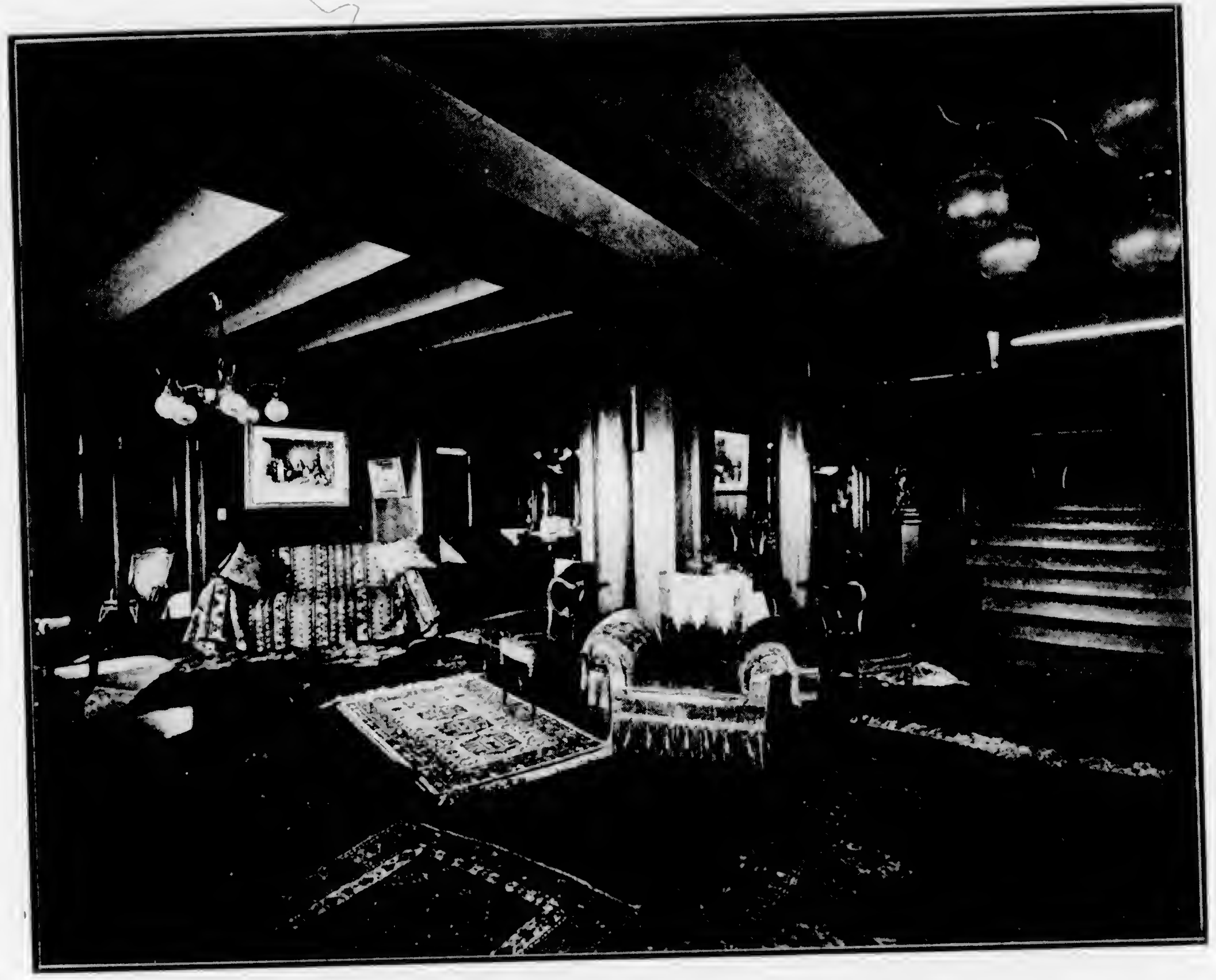

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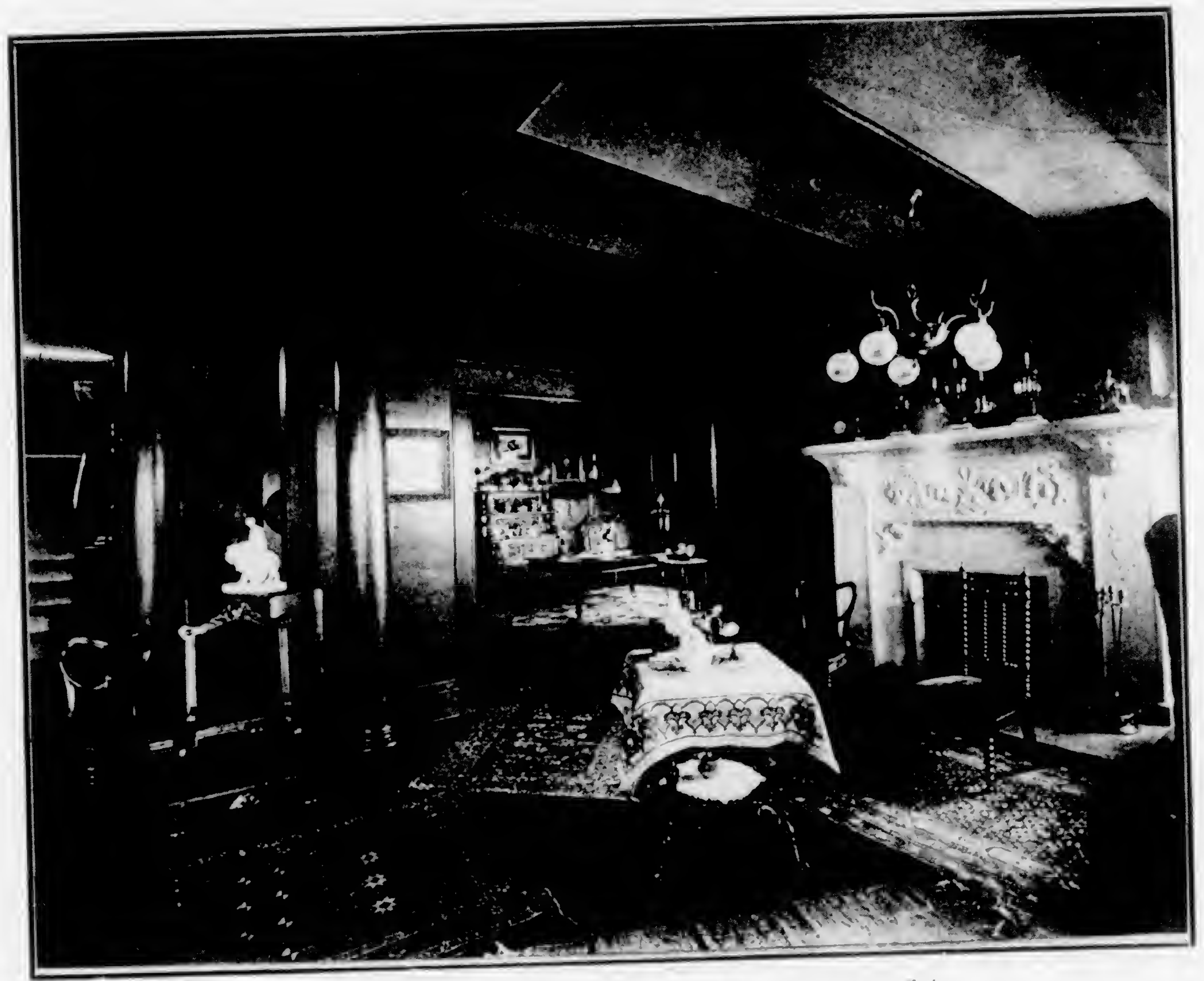

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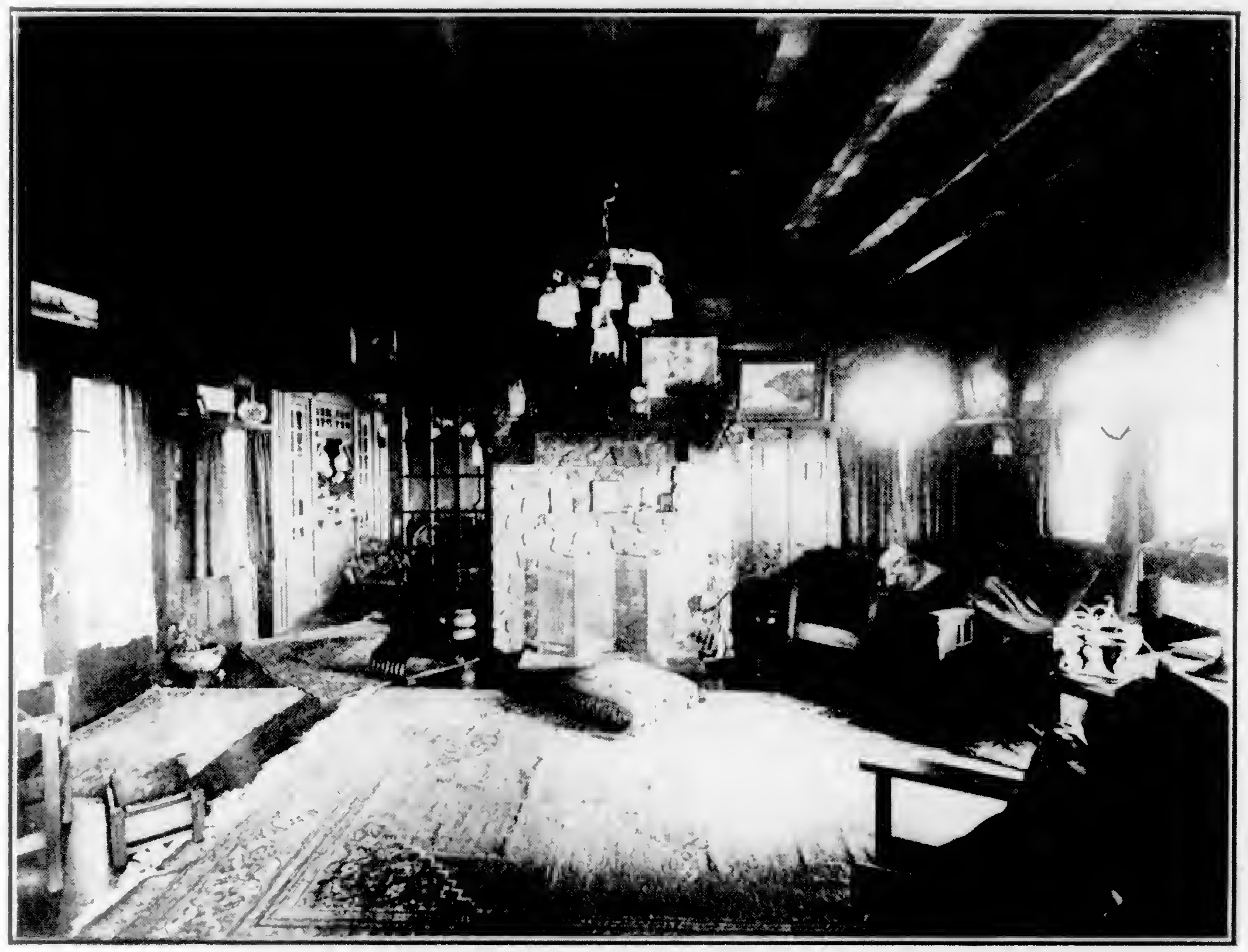
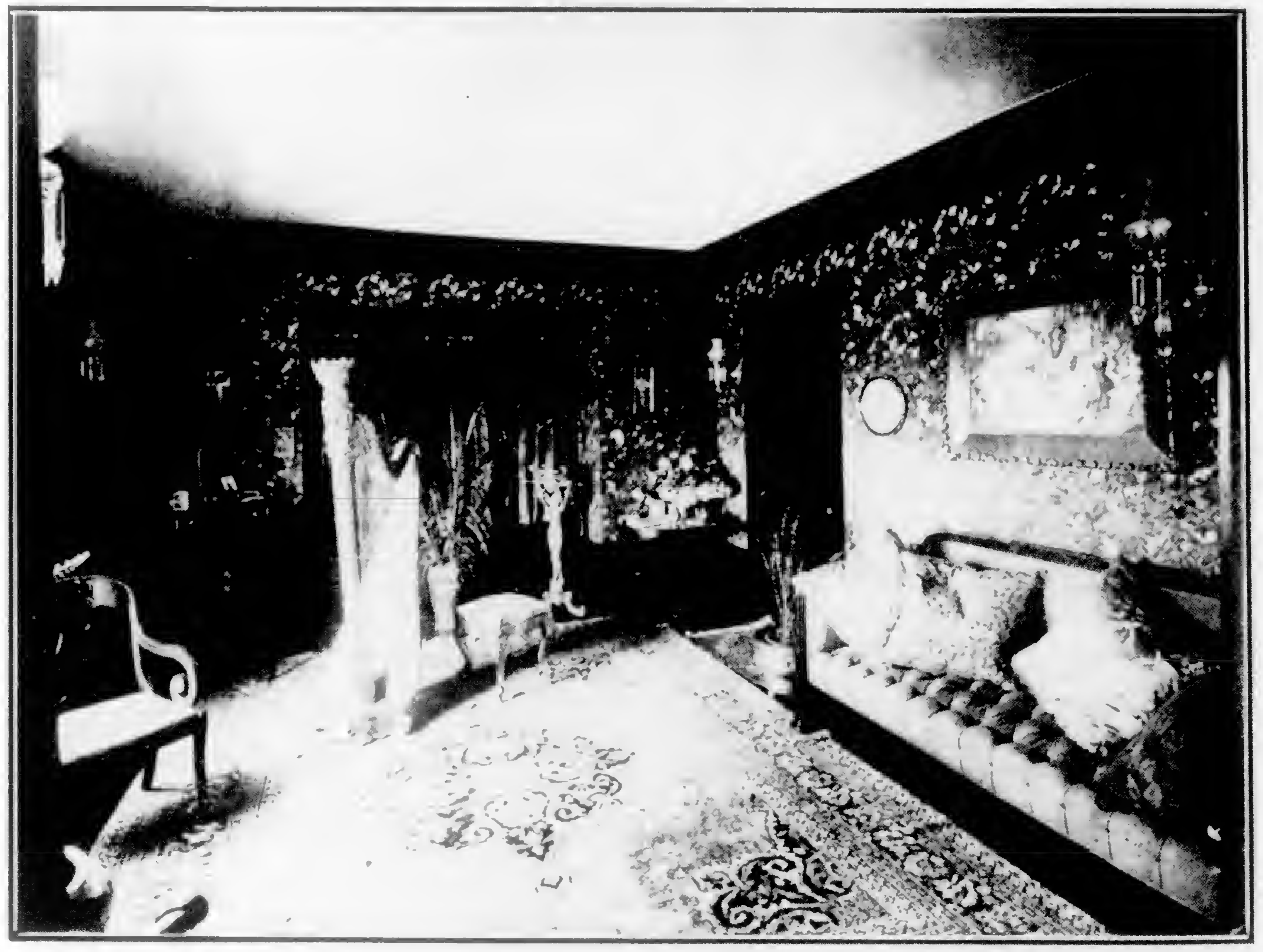
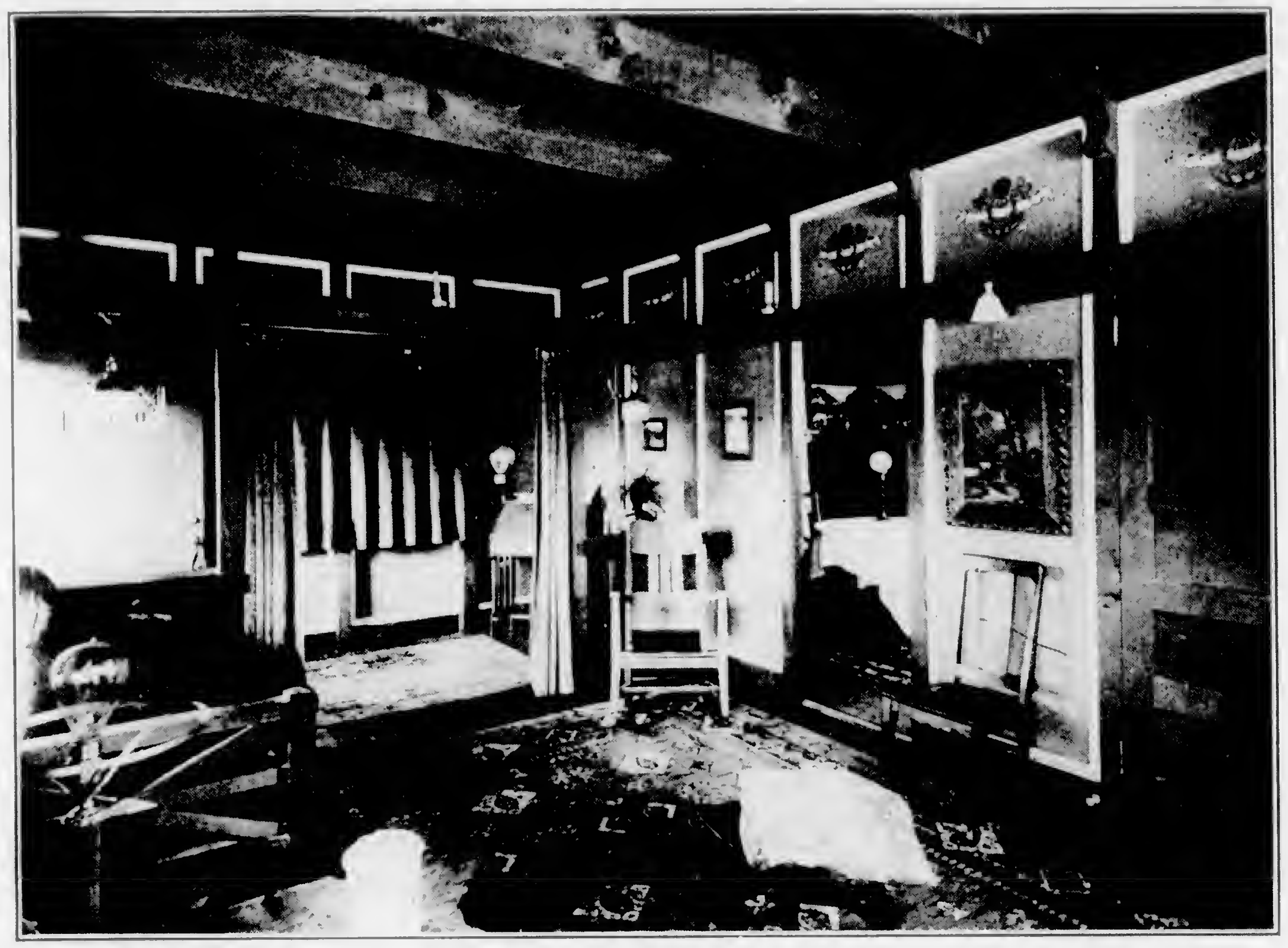


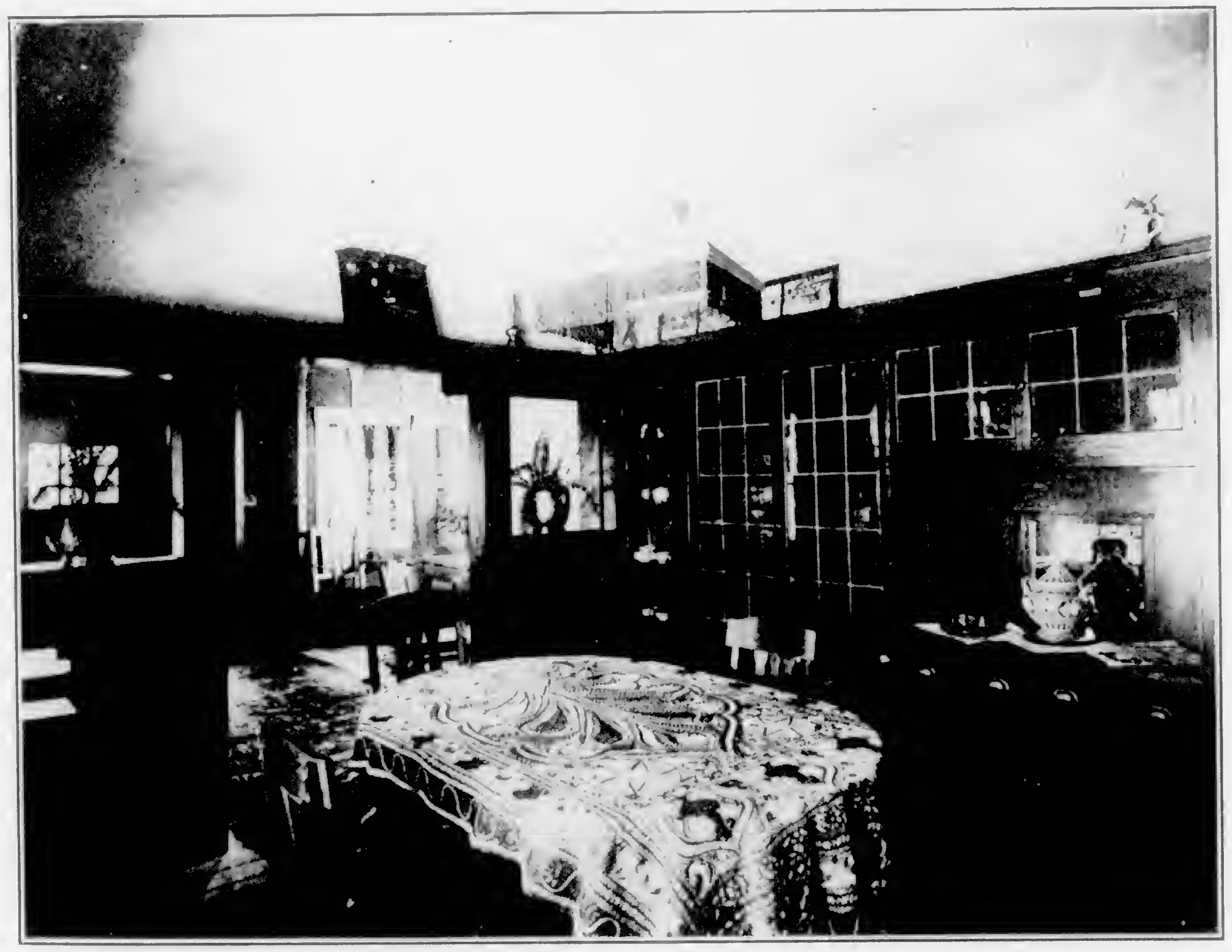
Living Room in Bungalow of T. Paterson Ross, Architect, San Francisco



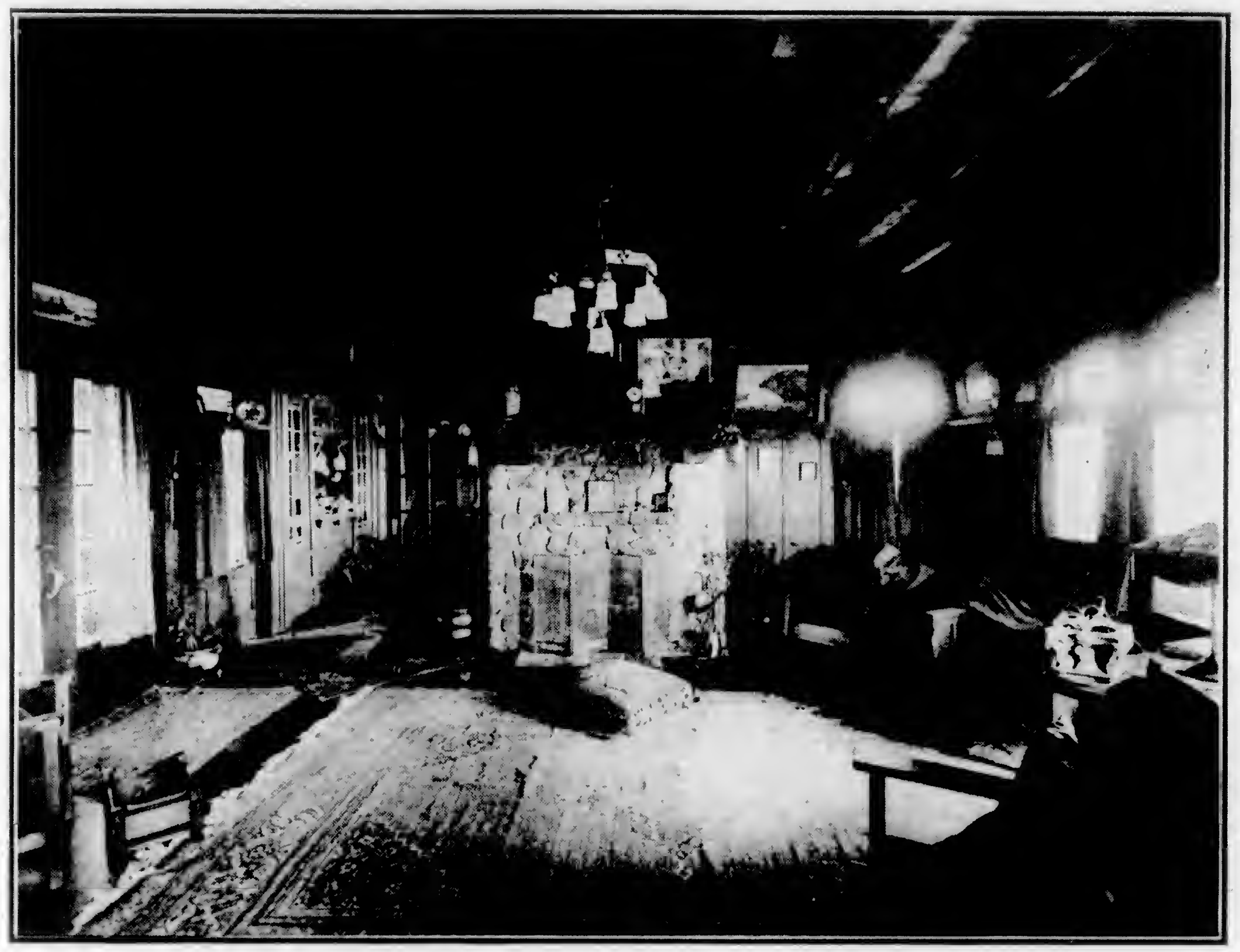
Music Room in Bungalow of T. Paterson Ross, Architect, San Francisco



Casa Reposa—The Living Room



Casa Reposa—The Dining Room



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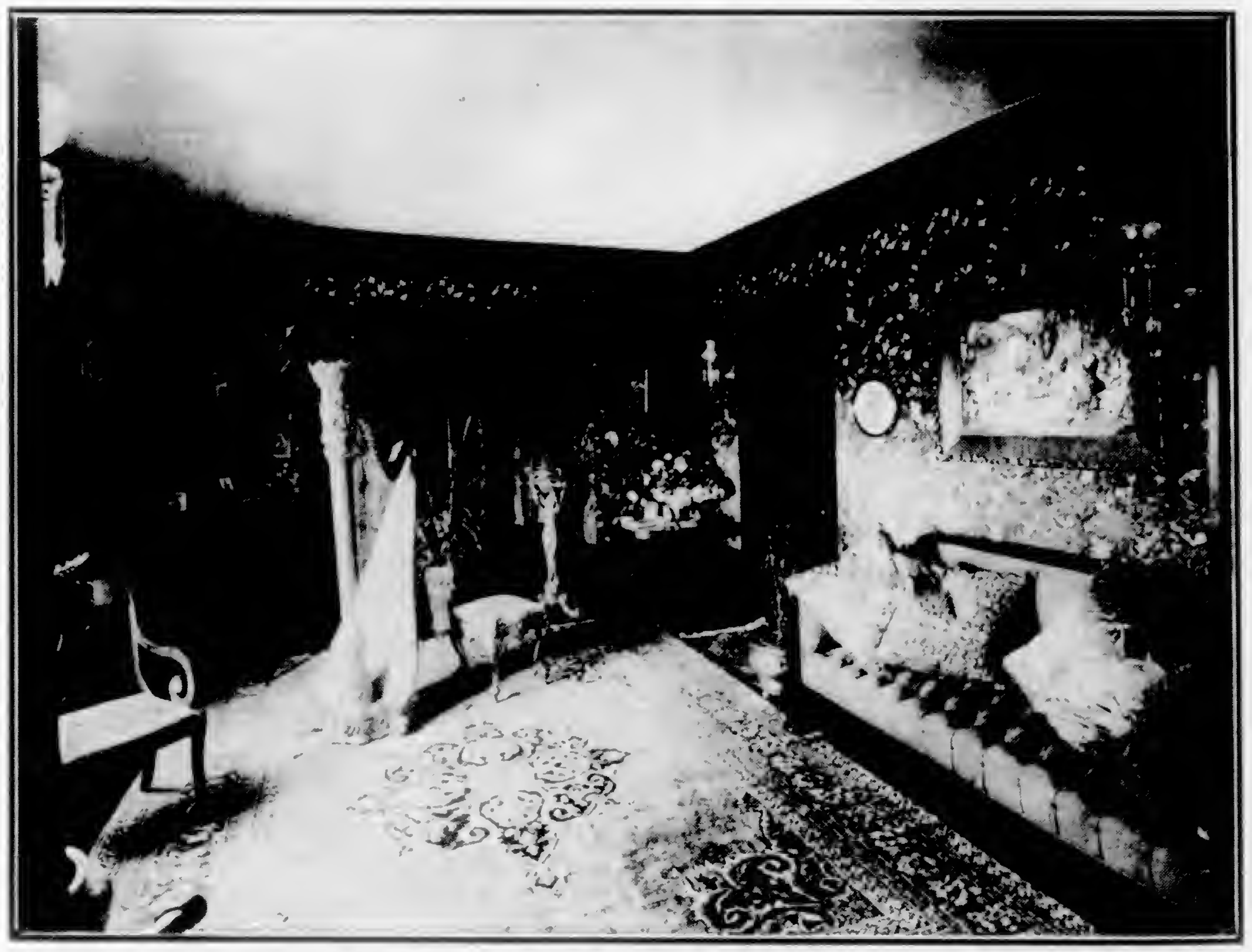

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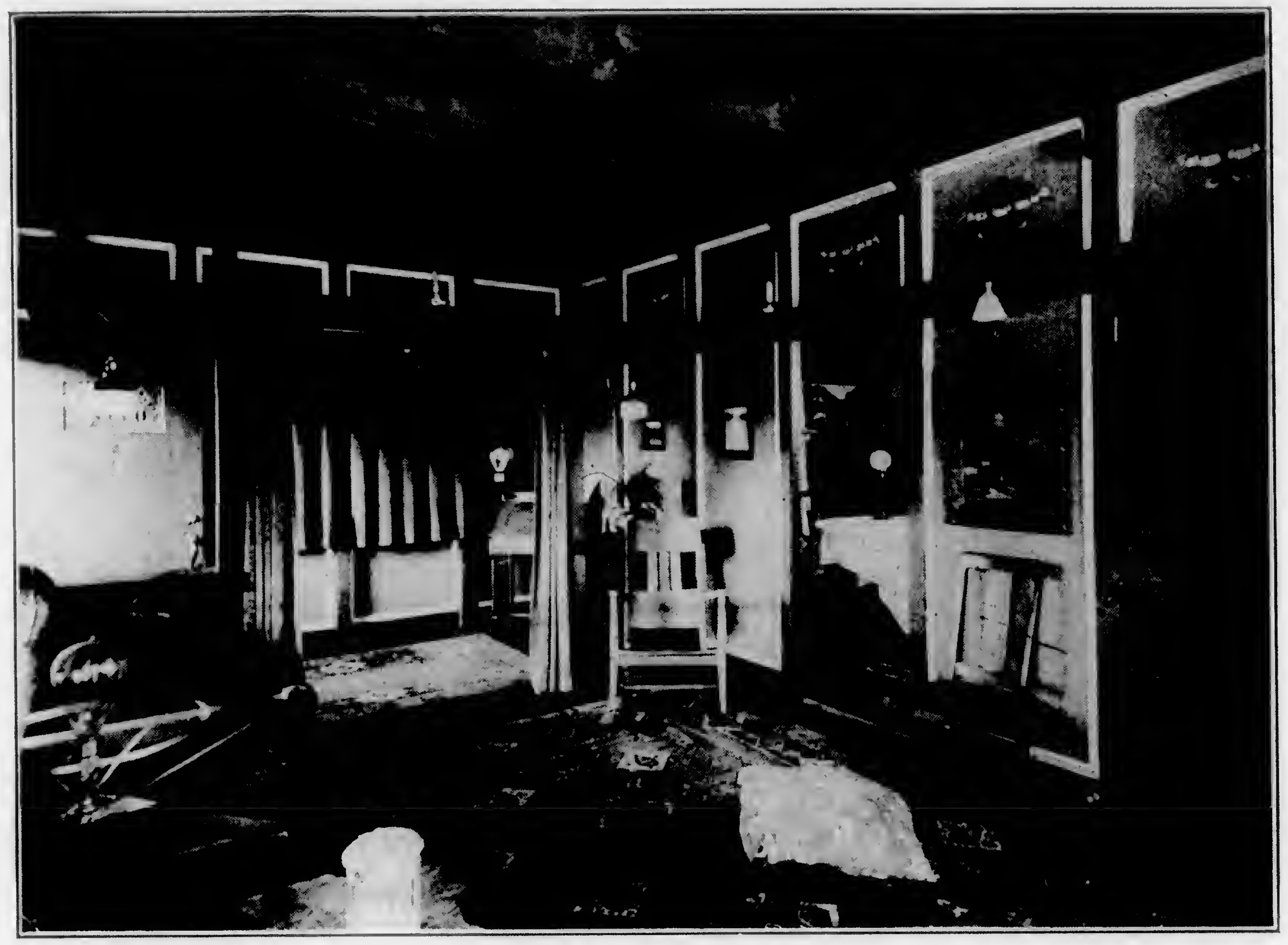

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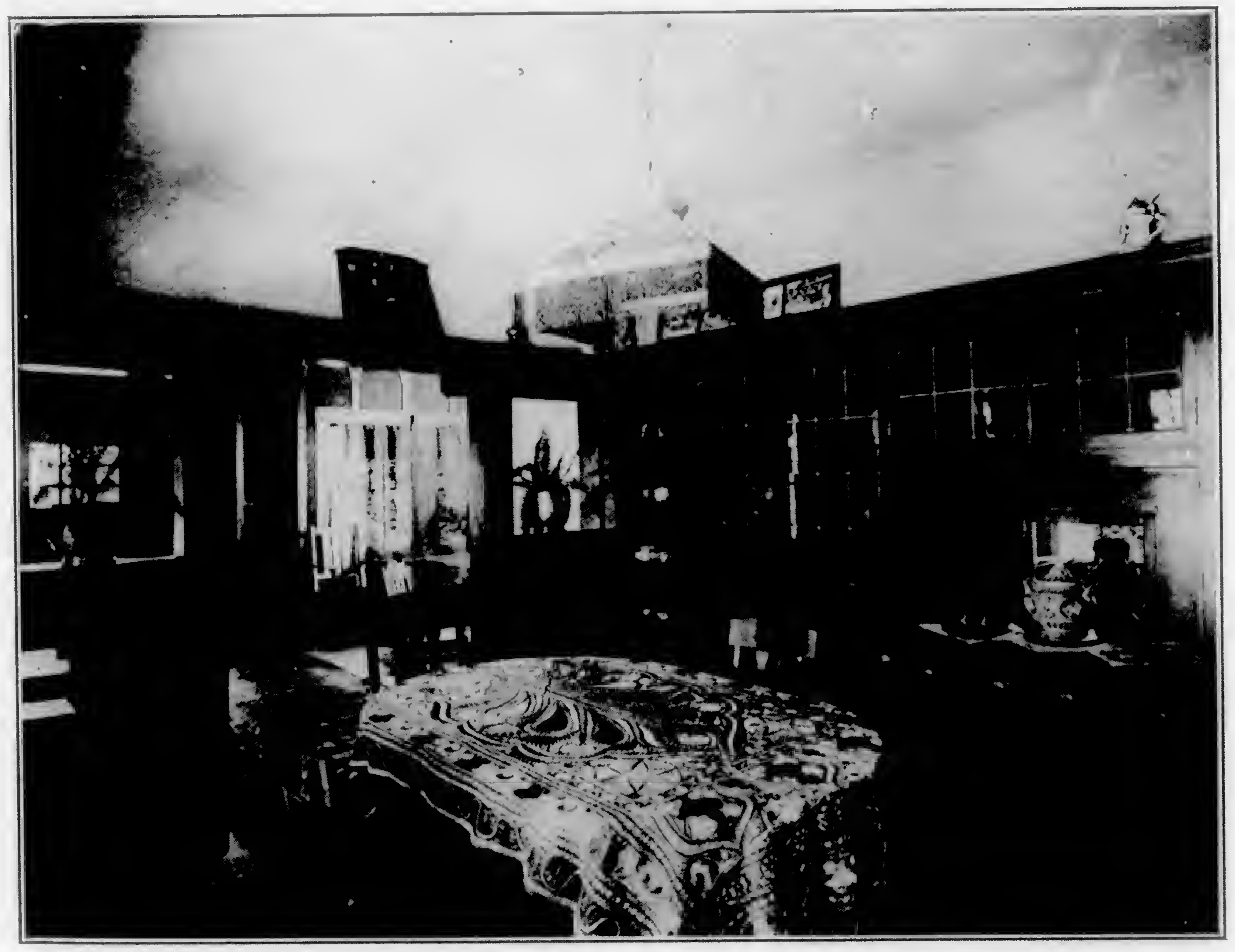

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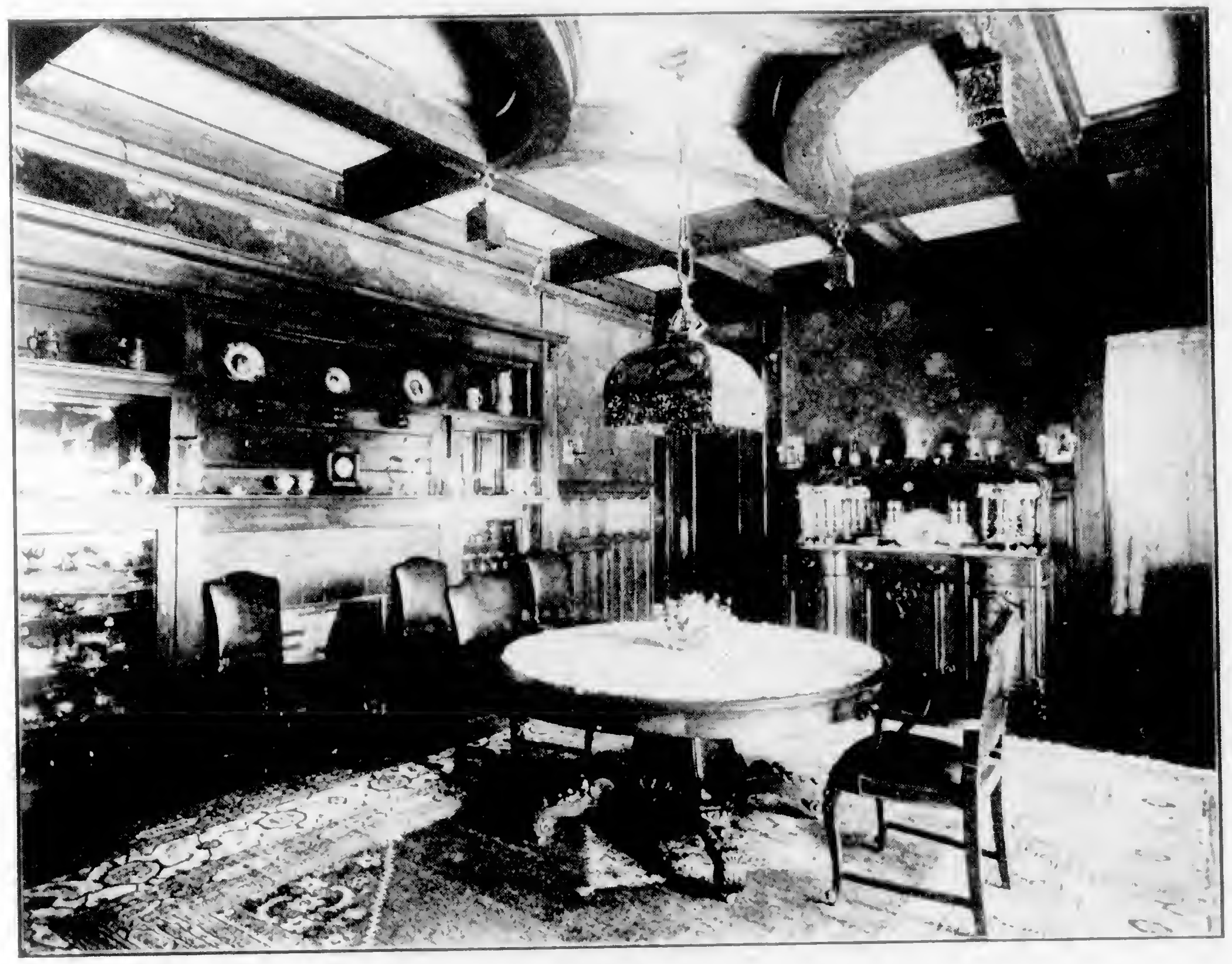


Dining Room, Residence of Mr. J. Ross Clark, Los Angeles
Hunt & Eager, Architects

Living Room, Residence of Mr. Frank K. Wilson, Los Angeles
Hunt & Eager, Architects

Bungalow Designed by Greene & Greene, Architects, Pasadena, Cal.

colors guaranteed as unfadable, and for this reason are the more welcome when used where the sunlight is particularly strong.

There are a great many varieties of weaves shown by both importers and manufacturers especially made for the bungalow. Fabrics with uneven warps bringing out the old-fashioned homespun effects are especially appropriate. An arras cloth gives a wide width, is double faced and is inexpensive. Stenciled and appliqué curtains are also very popular, and the arras cloth presents a peculiar fitness for this service. Bijar cloth is a new cotton material which is shown in a range of six colors.

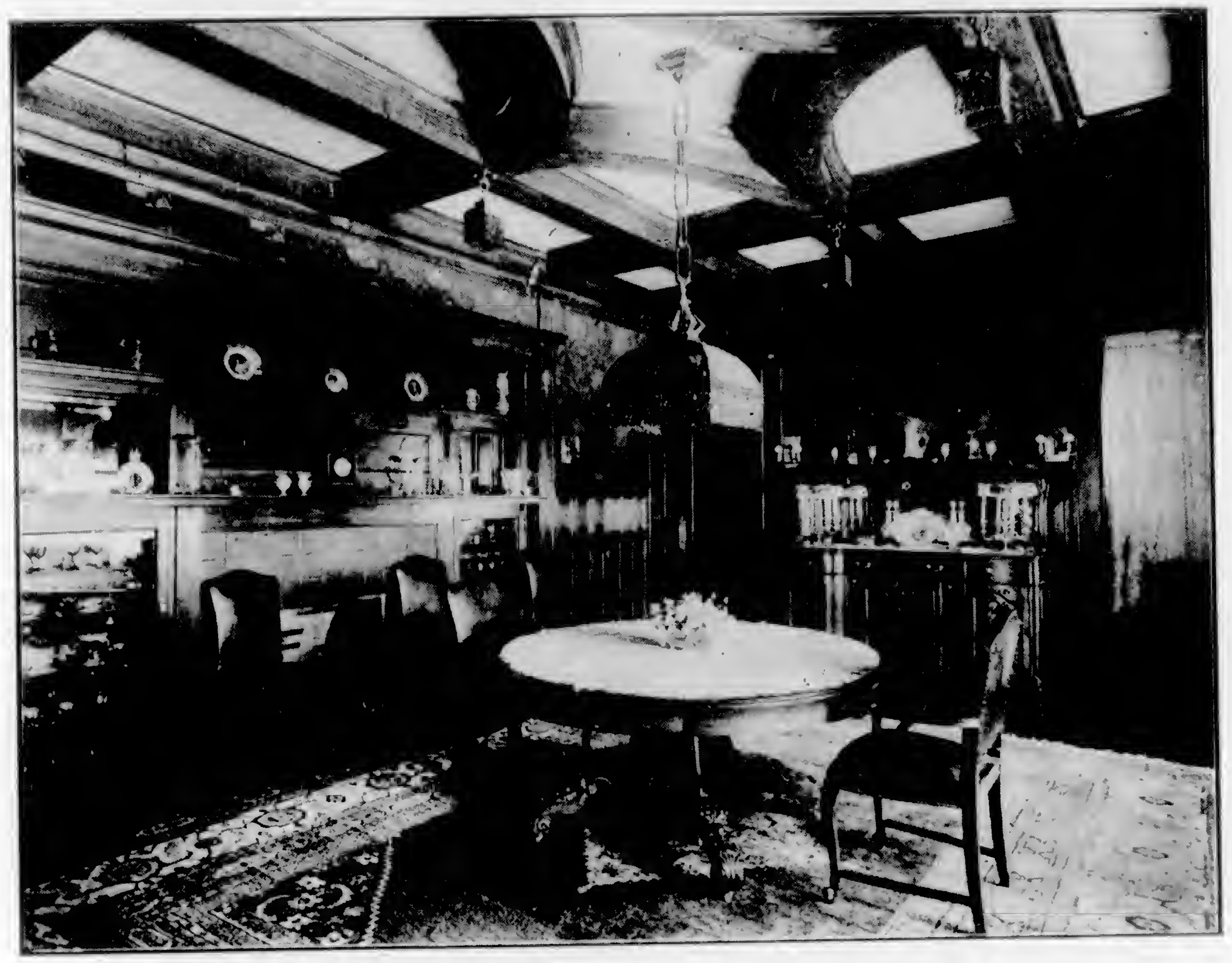
For couch and table covers the Bagdads and other Oriental designs are best. Their pronounced colors accentuate the general scheme of decoration. In using them it is better to repeat some color already on the walls or draperies.

The furniture should be selected for the purpose for which it was intended. Mission, willow, wicker, arts and crafts, are all suitable, and can be obtained in any color or finish desired.

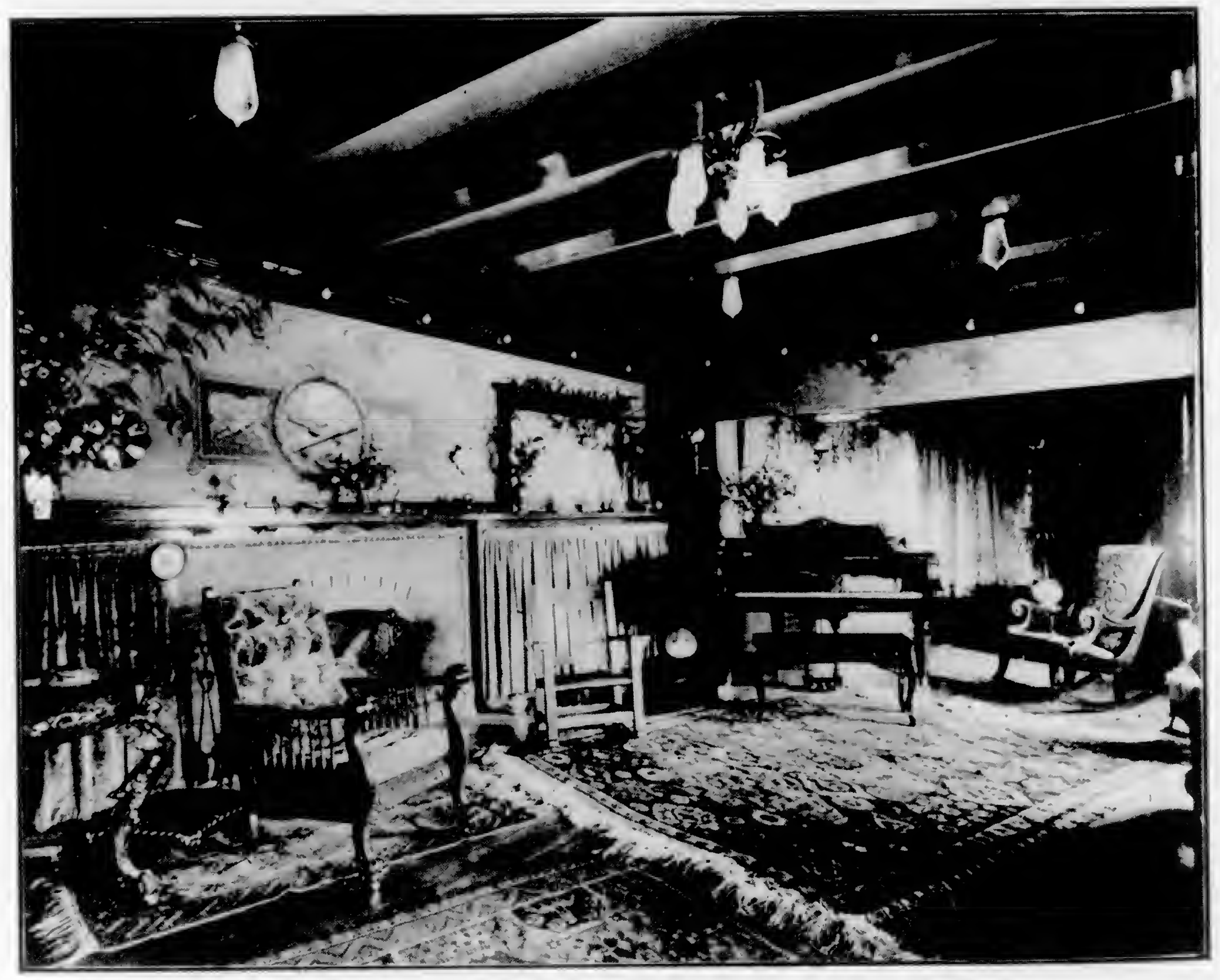
In the choice of rugs size is often as important a matter as either texture or design. In the living room a large rug covering the main part of the floor gives a greater sense of comfort than a large number of smaller ones. Carpetings that are especially appropriate for summer furnishings are woven in the rug style. One which is called the Madagascar rug is new this year. A cordage rug is made of nothing but cords, unevenly woven, which is very durable.

For a floor covering at a minimum cost, the grass matting makes a strong appeal by reason of its plain color and light weight. In the fiber matting rugs the designs and colors are very attractive.

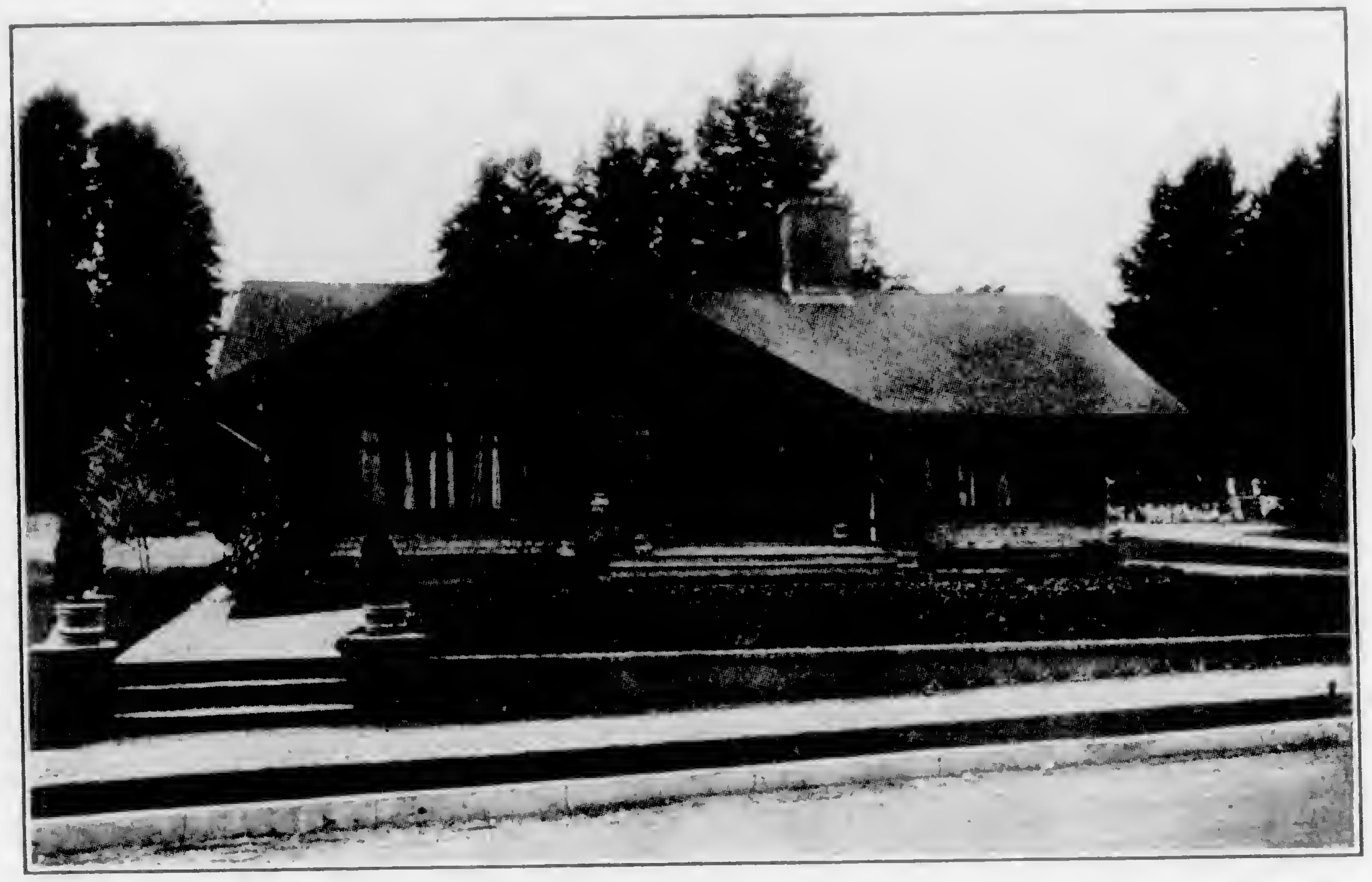
If small rugs are demanded and brilliant colors are desired the Navajo article is admirable. As wall hangings these rugs can be used to excellent advantage, and they can also be hung in doorways and as a covering for the lounge.



Dining Room, Residence of Mr. J. Ross Clark, Los Angeles
Hunt & Eager, Architects



Living Room, Residence of Mr. Frank K. Wilson, Los Angeles
Hunt & Eager, Architects



Bungalow Designed by Greene & Greene, Architects, Pasadena, Cal.

colors guaranteed as unfadable, and for this reason are the more welcome when used where the sunlight is particularly strong.

There are a great many varieties of weaves shown by both importers and manufacturers especially made for the bungalow. Fabrics with uneven warps bringing out the old-fashioned homespun effects are especially appropriate. An arras cloth gives a wide width, is double faced and is inexpensive. Stenciled and appliqué curtains are also very popular, and the arras cloth presents a peculiar fitness for this service. Bijar cloth is a new cotton material which is shown in a range of six colors.

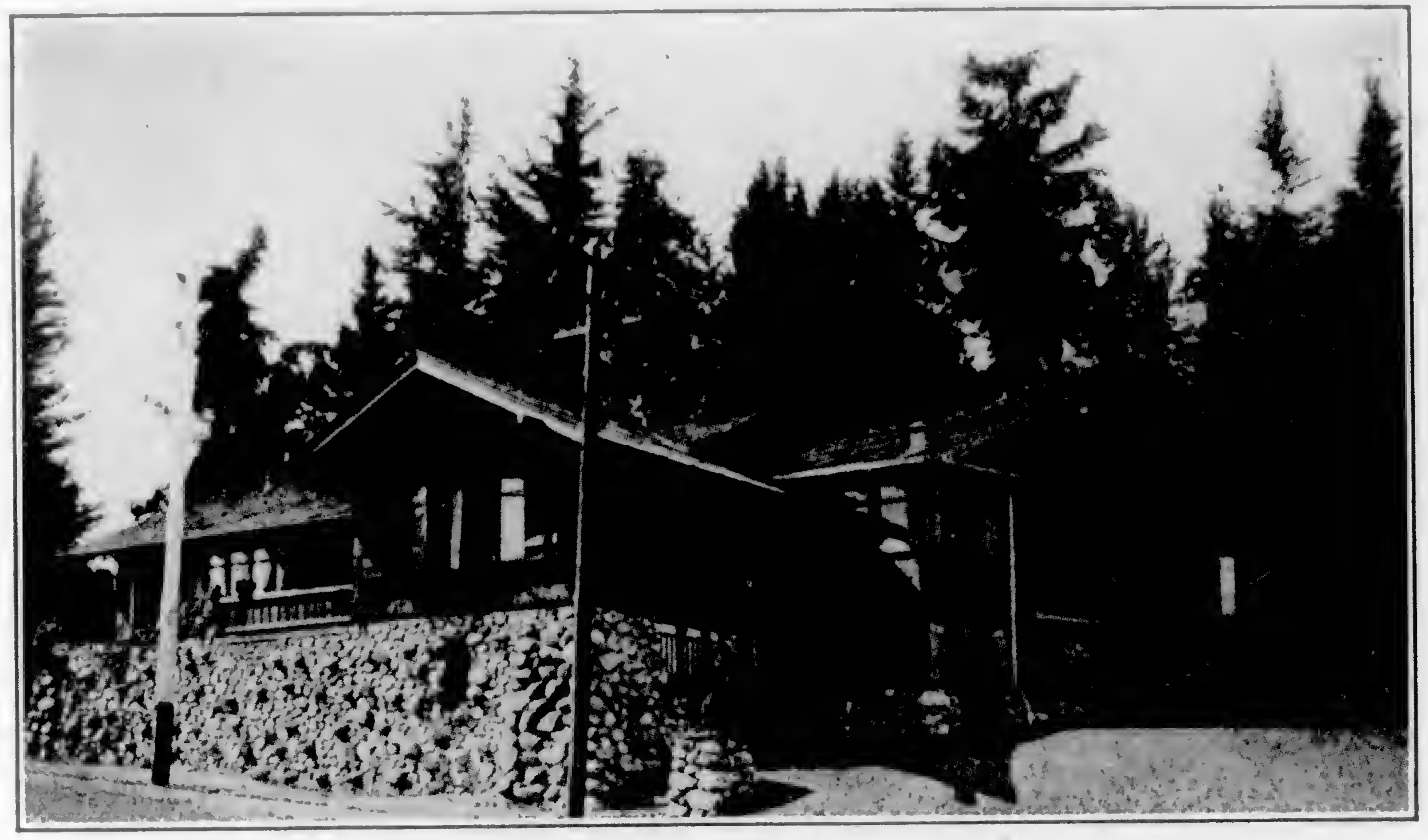
For couch and table covers the Bagdads and other Oriental designs are best. Their pronounced colors accentuate the general scheme of decoration. In using them it is better to repeat some color already on the walls or draperies.

The furniture should be selected for the purpose for which it was intended. Mission, willow, wicker, arts and crafts, are all suitable, and can be obtained in any color or finish desired.

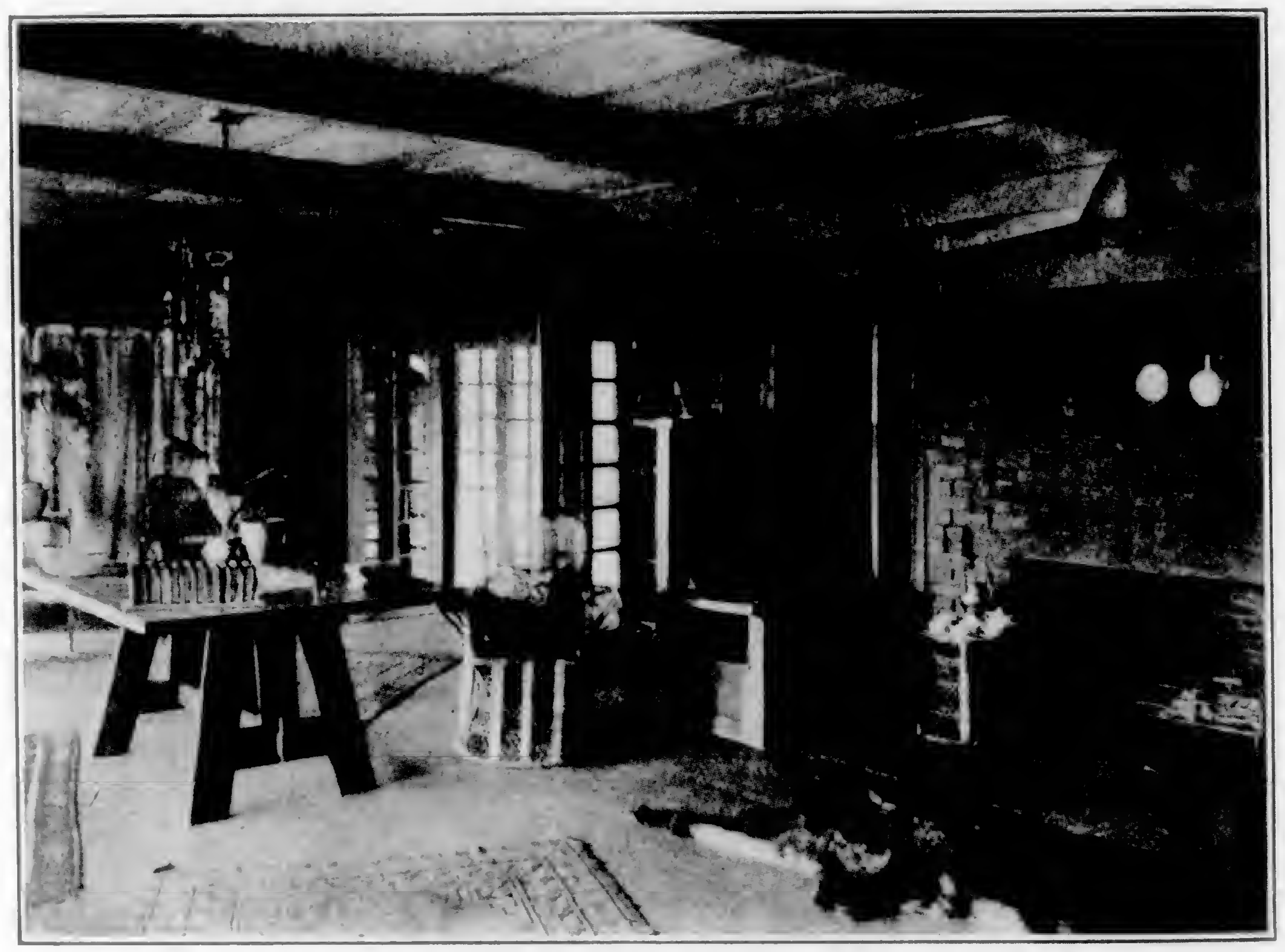
In the choice of rugs size is often as important a matter as either texture or design. In the living room a large rug covering the main part of the floor gives a greater sense of comfort than a large number of smaller ones. Carpetings that are especially appropriate for summer furnishings are woven in the rug style. One which is called the Madagascar rug is new this year. A cordage rug is made of nothing but cords, unevenly woven, which is very durable.

For a floor covering at a minimum cost, the grass matting makes a strong appeal by reason of its plain color and light weight. In the fiber matting rugs the designs and colors are very attractive.

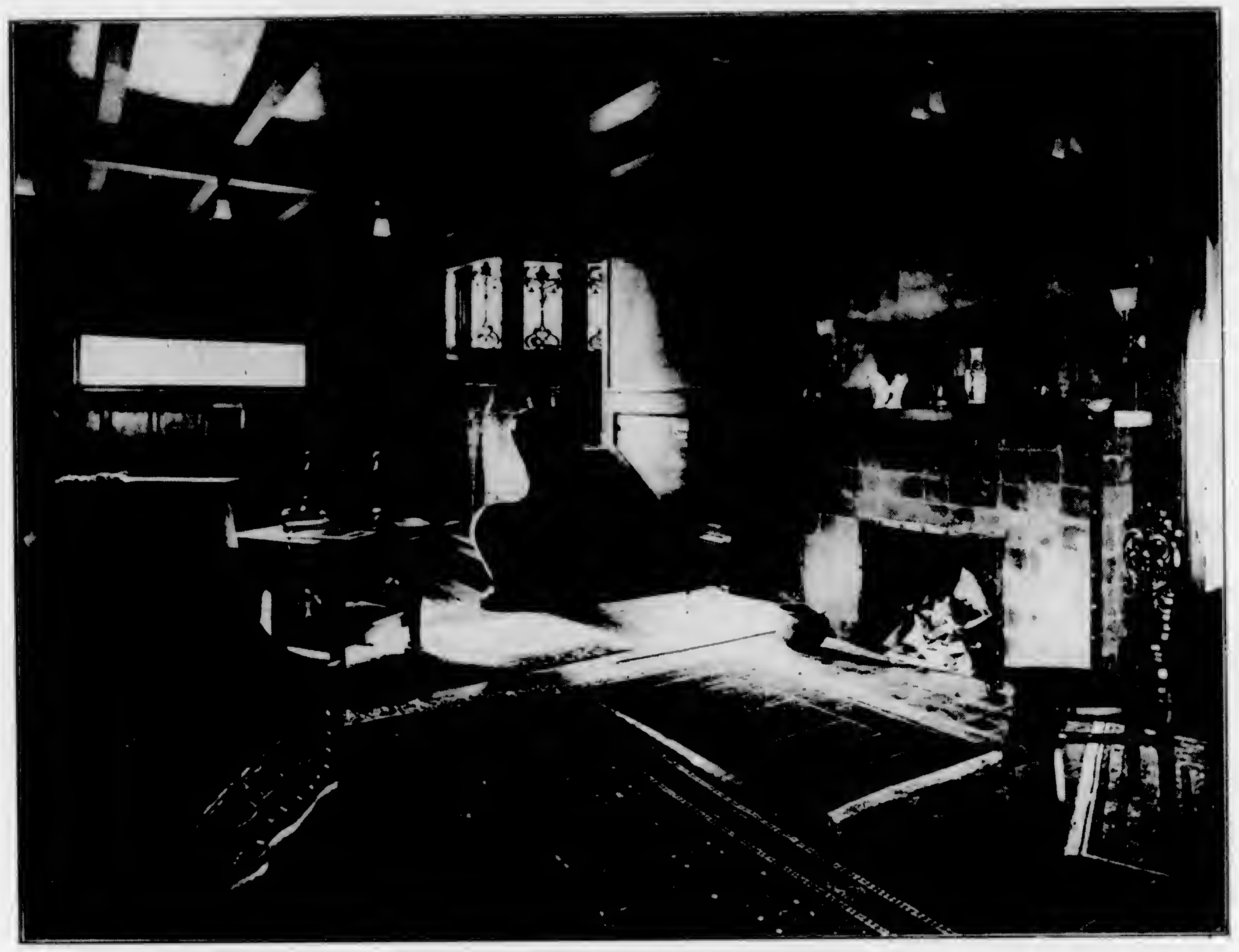
If small rugs are demanded and brilliant colors are desired the Navajo article is admirable. As wall hangings these rugs can be used to excellent advantage, and they can also be hung in doorways and as a covering for the lounge.



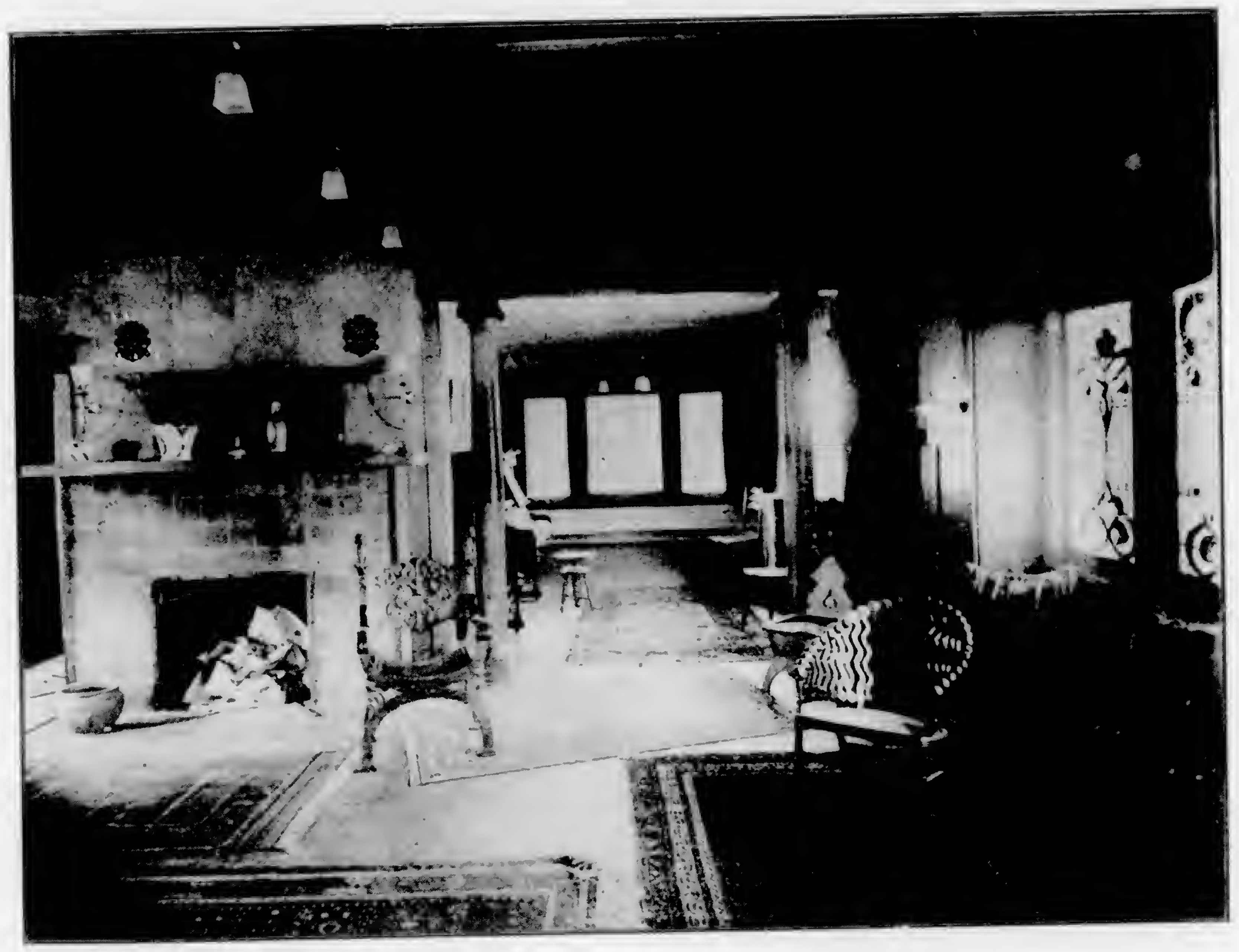
Bungalow in Southern California
Greene & Greene, Architects



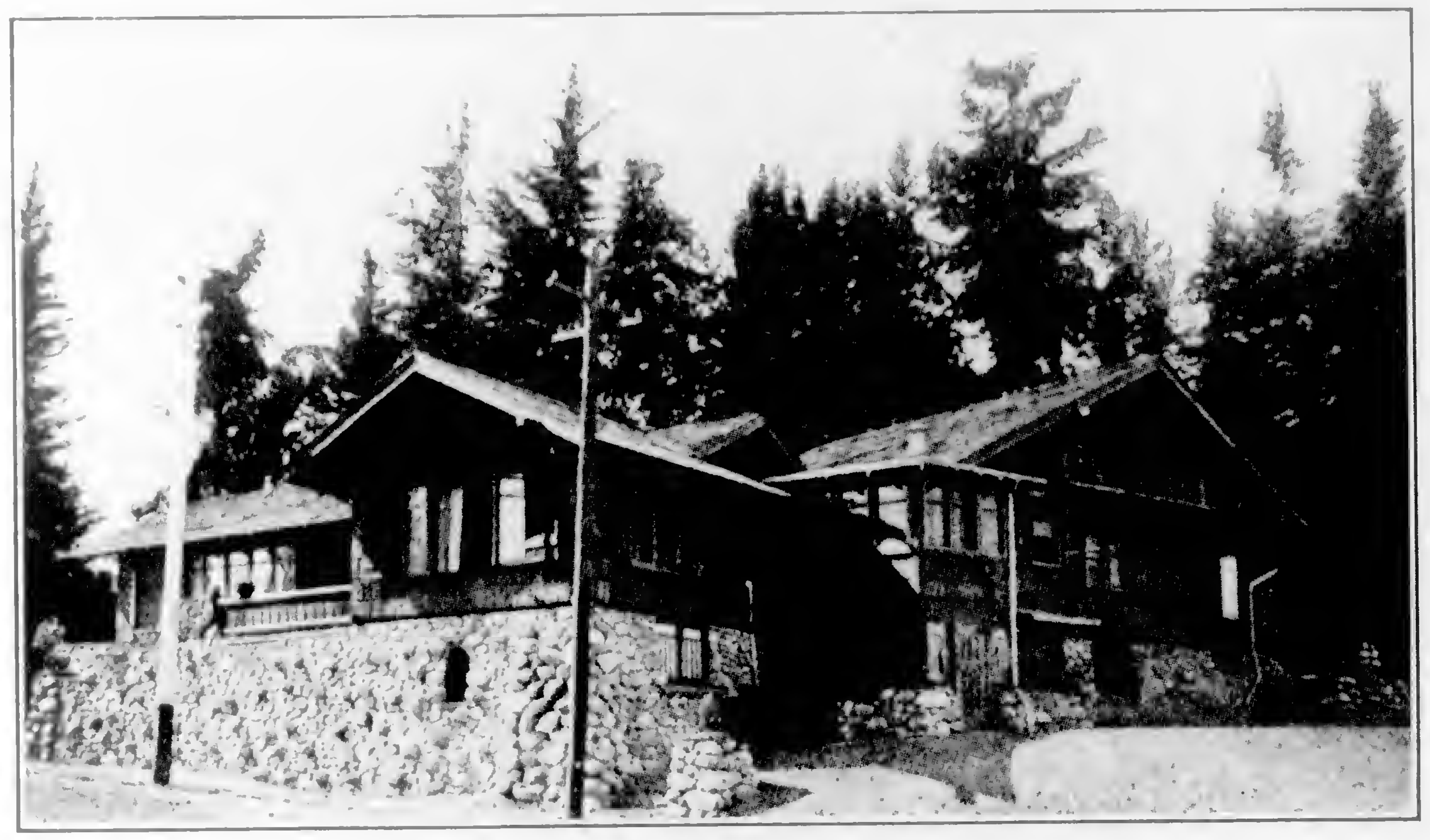
Interior of the same Bungalow in Southern California
Greene & Greene, Architects



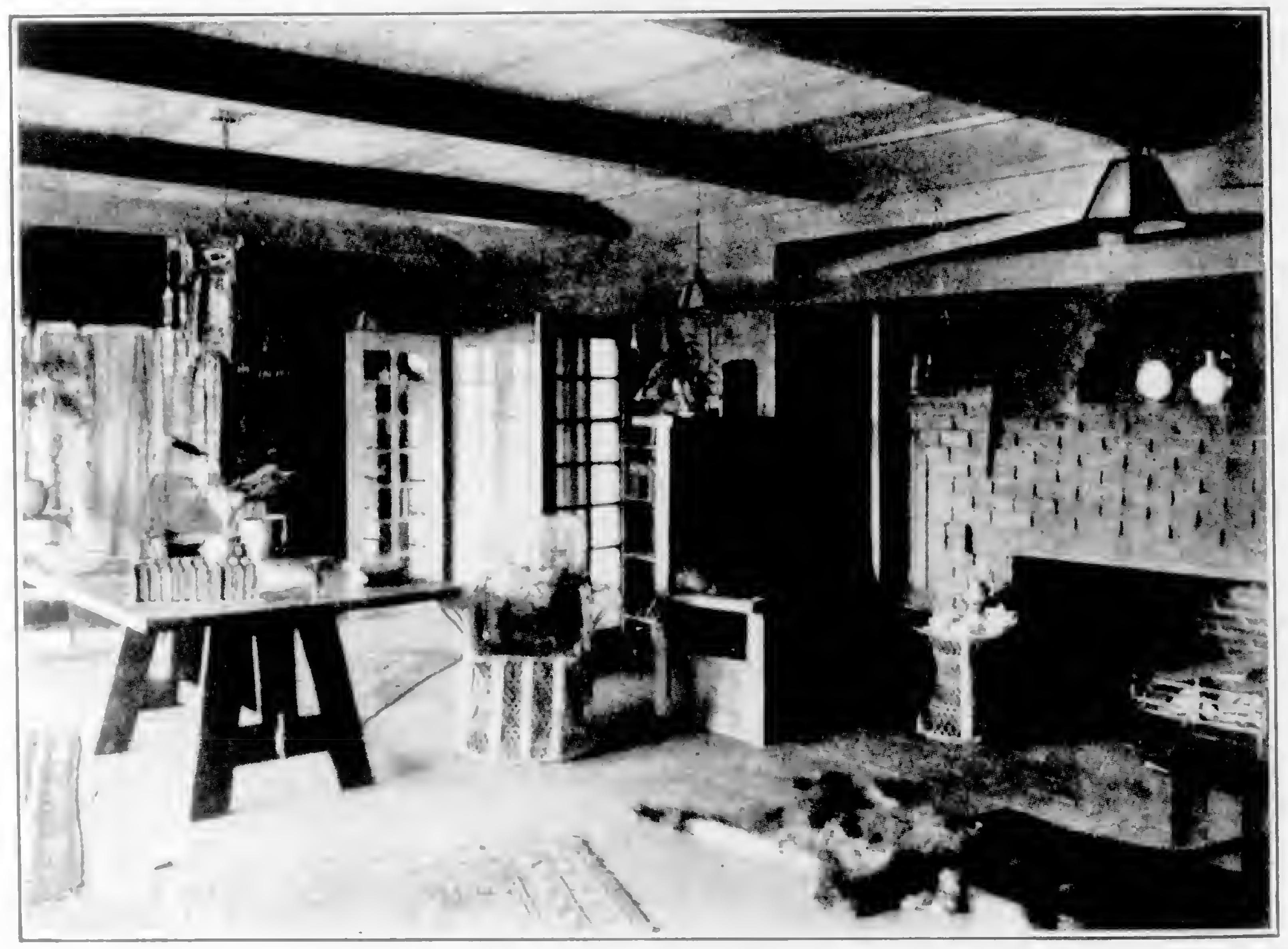
Interior of House of Henry F. Starbuck, Architect, Oakland



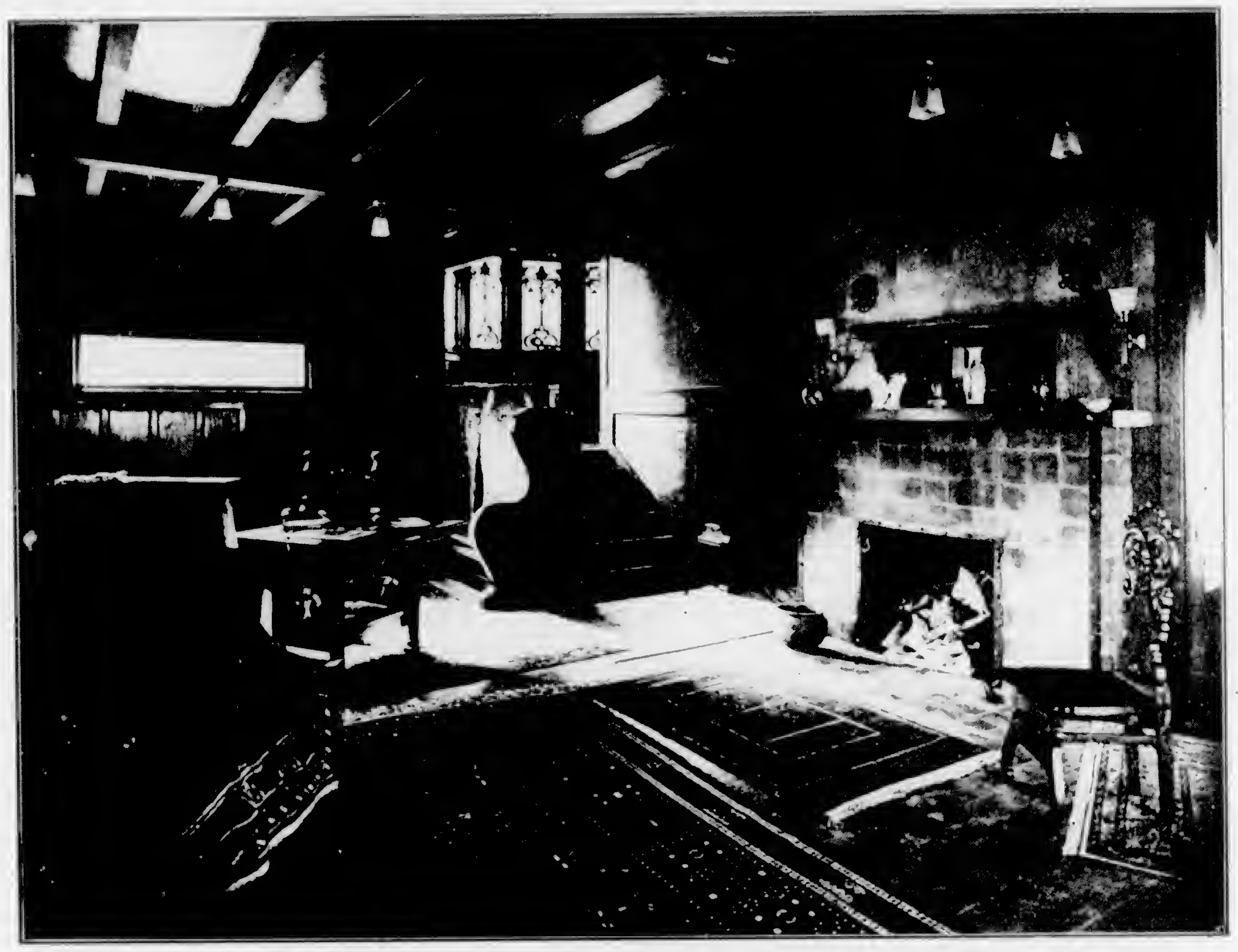
Interior of House of Henry F. Starbuck, Architect, Oakland



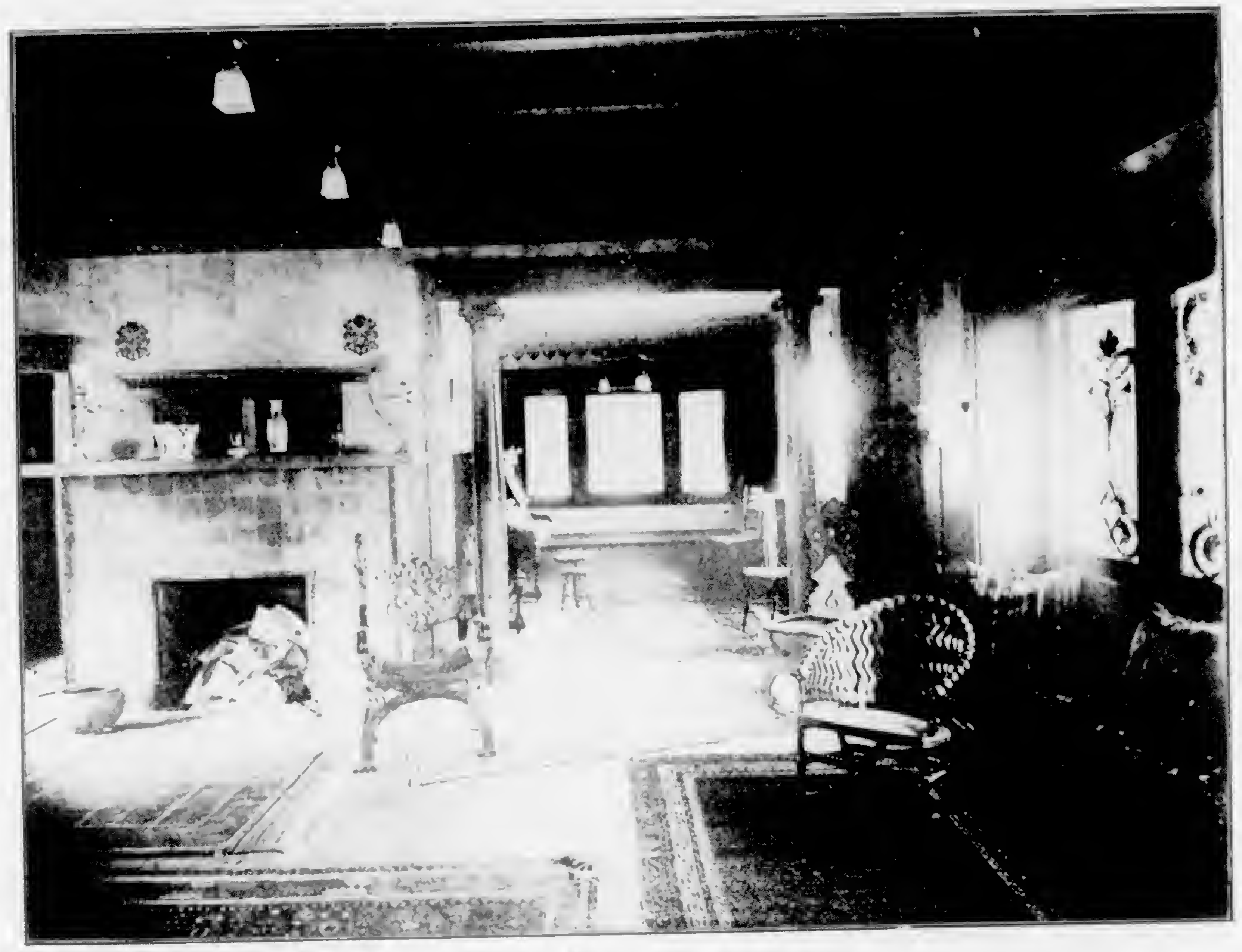
Bungalow in Southern California
Greene & Greene, Architects



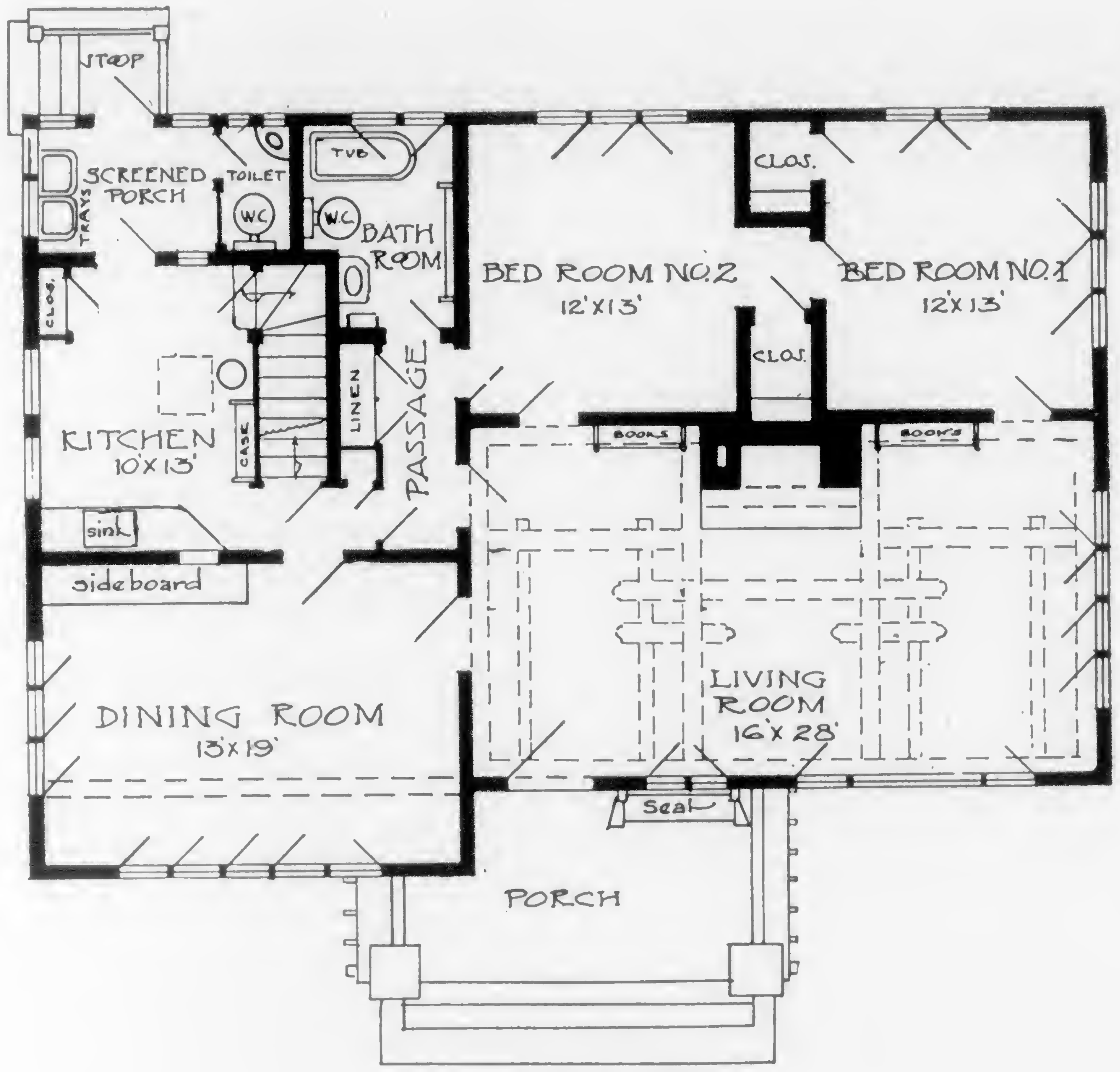
Interior of the same Bungalow in Southern California
Greene & Greene, Architects



Interior of House of Henry F. Starbuck, Architect, Oakland



Interior of House of Henry F. Starbuck, Architect, Oakland



PLAN OF BUNGALOW NUMBER 4

Floor Plan of Bungalow Shown on Page 71

A. G. Morrison, the well-known western decorator, recently submitted to the Decorative Furnisher a sketch which he executed and describes thus: It is the sitting room in a bungalow of a notable western editor. The dimensions of the room are 14 ft x 26 ft. The mantel is built of chipped brick; on each side of the fireplace is an ingle nook with appropriate cushions. The supporting columns, beams and furniture are in weathered oak, greenish brown and waxed finish. There are no window shades in this bungalow. Fine fancy net curtains in Arabian color and over these mahogany colored shikii silk curtains on separate brass rods and rings, take the place of the shade and the consequent roller, allowing the hinged sash to move with perfect freedom.

The Navajo blanket which covers the floor is a proper decoration, as it agrees with the straight lines of the mission furniture.

The walls in the living room are of rough plaster, painted in oil a warm brown color, and the ceiling between beams is in an orange chrome yellow. To the right may be seen an oil painting on buckskin of an Indian chief, while the baskets and other paraphernalia are reminders that the original inhabitants of the United States are fitted for other accomplishments than the use of the scalping knife and the chase.

The Client

The client calls in an architect to plan his house. The house is designed and built as planned.

The client calls in a painter who decorates the French house in English style and color.

The gardener is called and he plants some German flowers that please the client's wife and himself.

Now the architect is partially to blame, for it is a lack of detail, a want of thoroughness. He is the man who designed the structure and he knows best the treatment that design demands. A little more tact and careful presentation will make more finished and presentable work.

The elevation of that house as planned gave rise to certain masses from which certain lights and shades arise, which in turn call for a color scheme distinctively their own. The painter does not understand the underlying ideal of the work so well as he who conceived it and he is less capable of suggesting the treatment for this reason.

Gardening should frame the setting of the house; it should complete and enrich.

The use, definition and dimension of a building are all determining factors, making for the choice of its gardening whether it be formal, simple, grave or gay. And out of chaos comes harmony of plan when these are observed in site, position and arrangement. Fitness—eternal, everlasting fitness—is the thing. For mansion houses—mansion parks with their lawns and trees—for cottages—gardens with their flowers and vines.—Ex.

* * *

Cement's Affinity for Brick

The growing use of cement and concrete is not looked upon with any great favor by the brick manufacturers, whose product has suffered severely from the inroads of the former materials. What makes the matter more irritating to brick people is that no matter how good their product may be, it cannot dispense with cement, which must be used in making the mortar in which bricks are laid. In discussing the campaign that the brick manufacturers are waging against cement and concrete, Cement Age, New York, asks, "who is lacking in proper respect for a good brick, whether it shelters us from the blast of winter or comes to us in the form of 'Irish confetti,' as Pat termed the brick-bat." It then proceeds to say that the brick is worthy of every consideration. Indeed, portions of the first chapter of Genesis have been found engraved upon bricks. Bricks from Babylon almost disrupted one of the foremost of our institutions of learning, just as they have dispersed gatherings of less dignity and importance. Properly treated with good cement, a brick will never fail. Even the torrent of Niagara, which was unharnessed the other day after nearly twenty years of unceasing flow, had failed to dislodge a single brick in the mile and a half winding tunnel of the Niagara Falls Power Company. They were set in a sound cement and stuck to their job. Thus it is demonstrated that cement has an affinity for brick. Cement and bricks have gone hand in hand for centuries. The surviving edifices of ancient Greece and Rome are mute witnesses to this fact.—The Contract Record.

* * *

In These He's a Grafter

A thief is a man who robs you anywhere outside the Houses of Congress, State Assembly, or City Hall.

Among the Architects

American Institute of Architects

(ORGANIZED 1857)

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Talks on Fireproof Construction

(From the Portland Telegram, September 23, 1908.)

STONE is not a good material for resisting fire. The best fireproof construction is reinforced concrete, or reinforced concrete, faced with brick. This is the consensus of Engineer John B. Leonard's remarks on fireproof construction, last evening at Convention Hall of the Commercial Club. Mr. Leonard had a large audience of real estate men, architects and property owners of the city, and kept the attention of his hearers throughout his address, which took up about an hour and a half.

The speaker is a well known engineer of San Francisco, and was in that city in the great fire, and has been particular to observe the effects of great heat on all sorts of building material. He spoke last night under the auspices of the local Architects' Club, with which the Realty Board was united for the time being.

He mentioned the old Palace Hotel in San Francisco as a close approach to perfection in what he termed "reinforced brickwork," while he condemned the City Hall of that city as the other extreme of construction, having been built by dishonest contractors, and collapsing when the earthquake came, in April, 1906.

Lantern slides were used in making his remarks plain, and showed how the great fire affected different kinds of construction. Steel columns, which had "buckled" under the great heat, were in evidence to prove that steel construction should be guarded from fire by a coating of cement or other fireproof material, and cracks in concrete floors illustrated the necessity of using reinforced material in such a manner as to render the strain on such floors uniform.

In the picture of the Palace Hotel after the fire, the walls were shown in almost perfect condition, although the earthquake had wrecked many of the brick buildings of more recent construction. He attributed the strength of the building to the use of iron and steel in the courses of brick in the walls, and to the introduction of 10 per cent of cement in the mortar. This building has since been razed, that a steel skeleton structure might replace it, he said.

He cited the Bruner building, just finished in Oakland, across the bay from San Francisco, as the highest type of fireproof construction. This is a tall building of reinforced concrete, the walls of which are faced with brick of unusual shape. This brick has a groove cast on its inner edge, that the concrete may be dovetailed in the brick as the walls rise. The brick is the usual size, and the wedge-shaped groove is the invention of an Oakland man, who had observed how difficult it is to keep a brick facing in position in a concrete wall in a conflagration.

Mr. Leonard thought municipalities should arrange to have whole districts rendered fireproof, so as to stop the spread of flames.

"If districts cannot be made fireproof, then individual blocks should be," he said, "and stringent regulations should be resorted to in compelling property-owners to erect fireproof structures."

He referred to the Stanford University, at Palo Alto, as an illustration of his theory of reinforced concrete in the presence of an earthquake. Where the museum was built of this material he found the damage slight, but in other forms of construction the loss ran into the hundreds of thousands. Mr. Leonard was introduced to the audience by Architect Joseph Jacobberger, of Portland, who referred to him as one of the ablest men of the Coast in the line of building construction.

To Revise Building Laws

The advisory committee to the San Francisco Board of Supervisors, appointed. to revise the building laws, has organized by electing Wm. F. Wilson chairman and M. Bruce secretary. The advisory committee consists of the following well known gentlemen, each of whom will devote his talents to special sections of the law:

F. H. Porter of the Bureau of Fire Underwriters will handle fire protection; J. D. Galloway, C. E., and Nathaniel Blaisdell, architect, will consider reinforced concrete and structural matters; Chas. A. Day, commissioner on Board of Public Works, will specialize on Class "C" buildings; John P. Horgan, Chief Inspector of the Board of Public Works, on the enforcement of the law, fees, etc.; Wm. F. Wilson, the well known plumber, will handle the plumbing law; Fire Chief Shaughnessey's experience is also called into service. Mr. Bruce, the secretary, is associated in the office of Albert Pissis, architect.

San Francisco to Have New City Hall

Another month will probably see in progress the active demolition of the old San Francisco City Hall. Supervisors Rixford, Broderick, Booth, Pollok, McLeran, Murphy and Bancroft, the special committee in charge, has received the report of Architects Albert Pissis, James Reid, John Galen Howard and Newton J. Tharp to the effect that the structure be entirely removed and the city build a new structure and the committee acted at once in favor of the recommendations.

The work of removal will be let in at least four separate contracts so that the razing of the different parts may proceed expeditiously. The supervisors believe the salvage of brick and iron will be sufficient to pay for clearing it away once the work is started, but the money will be provided to initiate the proceedings.

The people will be asked in January or thereabouts to authorize a bond issue of probably $5,000,000 for the construction of a modern fireproof city hall.

It is understood that Mayor Taylor and many of the board members favor the erection of a classic group of small buildings instead of one enormous pile, as more consonant with the city's needs. The plan offers several advantages. More light and air to the floor space would be available, and the devotion of single buildings to individual departments would aid citizens in doing business with the municipality.

Personal Mention

Structural Engineer John D. Galloway, who has been a member of the firm of Howard and Galloway, 604 Mission street, San Francisco, since the fire, has opened an office independently in the Balboa building. Architect Howard has taken into partnership Mr. Hays, who has been associated with the firm for a number of years.

Welsh and Carey, architects, whose offices have been at 40 Haight street since the fire, have moved to spacious quarters in the Mills building, San Francisco.

Bohemian Club to Build

The Bohemian Club of San Francisco has, through its building committee, Jas. D. Phelan and F. W. Hall, issued a call to architects who are members to offer plans in competition for a new home. The building will be erected on the northeast corner of Post and Taylor streets, the site of the old temple. The proposed building will contain spacious meeting quarters and private apartments for members and is to be laid out on a very elaborate scale.

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STATE LAW NEEDS REVISION

There is evidently something radically wrong with the California State law dealing with members of the architectural profession who have failed to pass the examination of the State board, or who, for obvious reasons, have been refused a license to practice as a registered architect.

In Los Angeles several arrests have been made and the defendants have appealed to the higher courts with the idea of testing the validity of the law. It is contended that a person can practice architecture without a license provided he tells his clients he is not licensed.

In Oakland, a member of the profession has been advertising in the newspapers, the word "architect" being displayed conspicuously after his name. He has no state license and has never made application for one. Complaint was made to the State board and the facts were given to the District Attorney of Alameda county, who, after investigating, decided that the law is defective and that the alleged offender could not be prosecuted. It seems there is a clause which permits a non-registered architect to advertise as an architect providing he advises his clients that he has no certificate. The Oakland architect in question claims to have complied with this requirement, which, of course, must be taken cum grano salis, hence the District Attorney's refusal to prosecute.

With such a provision in the State law the registered architect is afforded little protection and unless it is corrected there would seem to be no great advantage derived by an architect in holding a State certificate.

TO INCREASE MEMBERSHIP OF THE A. I. A.

There is a movement on foot to increase the membership of the American Institute of Architects. President Cass Gilbert is directing the campaign which has every indication of being a success. The movement deserves encouragement, for it has too long been delayed. The older members of the Institute have undoubtedly felt for many years that only by means of a thoroughly representative body including a majority of the ablest and most conscientious practitioners in every section of the country could the highest aims of the organization be achieved; and they have also doubtless been conscious of deficiencies in this respect, but it has apparently remained for President Gilbert to counsel and insist upon the adoption of the active and aggressive measures at present being employed to strengthen and build up the organization's membership through the various Chapters.

But though new recruits will be found and the membership of the Institute is sure to increase and be strengthened in response to the present vigorous campaign, which probably is the thing important and desirable, there seems little doubt that the labors of the membership committees are today largely made necessary by palpable and flagrant delinquencies on the part of Institute members in years gone by, and extending perhaps unpleasantly near to the present year of grace. Every architect knows of the Institute, and the fact that there are so many able and prominent men in the profession unidentified with it, is in itself a matter which would seem to suggest a look within. No exception can be taken to the professed aims and purposes of the organization, and the rules laid down for the conduct of the members professionally can fairly be considered above serious criticism. Moreover, there is an undeniable value in the form of professional standing and ability guaranteed by the mere fact of membership. Why, then, asks the American Architect, has not the average member of the Institute a distinct advantage over a non-member? He has; and this advantage would become inestimable, and so apparent that all qualified architects would become members unsolicited if only a stricter observance of the Code of professional practice were exacted from all members.

Supervising Architect Visits the Coast

Government Supervising Architect James Knox Taylor recently paid a flying visit to the Pacific Coast, visiting Portland, San Francisco, Los Angeles and other points where new Federal buildings are being built or are soon to be constructed. At San Francisco he was detained nearly a week making a selection for the new sub-treasury building to be built there, and looking over the repairs to be made to the postoffice building.

At Los Angeles he went over the plans for the proposed changes to be made in the postoffice building with the superintendent of construction, O. J. Muchmore, and also with Senator Frank P. Flint and Postmaster Motley H. Flint.

This being Mr. Taylor's first visit to Southern California he was naturally very much impressed with its general appearance. He visited San Francisco about seven years ago, but returned directly east. He has a number of warm friends in Los Angeles who were anxious to show him the sights and entertain him in proper style.

The position that Mr. Taylor occupies in the government service is one that deals directly with the erection and maintenance of courthouses, customhouses, postoffices, marine hospitals, and numerous other public buildings used as office rooms for the great army of civil employees of the federal government, and for the storage and safe keeping of public funds and public documents; therefore, the work of the office of which he is the head is directly felt in all parts of the country. By drawing the plans and specifications for nearly all federal buildings the work of the supervising architect does much to determine the character of American architecture.

Mr. Taylor announced he has in view a radical change in the method of selecting architects for federal building work. His plan, unfolded before a gathering of Los Angeles architects, is to district the country and invite architects living within each district to submit plans for federal buildings proposed for that district. As it is today, Eastern architects are given practically all advantages in designing federal buildings. Mr. Taylor states a sufficient number of competent architects are scattered throughout the country to warrant excluding others from local work. He is now working out the plan and hopes to see this method in operation in the near future.

HEATING AND LIGHTING

Material Arranged by Carl E. Roesch, Edwin B. Pike
and Wm. E. Leland, S. B.

Light, Illumination and the Engineer

By F. Emerson Hoar.*

OWING to the fact that the word light is used scientifically in two distinct senses,—both to designate the sensation of vision and the usual cause of that sensation,—there is considerable difficulty in avoiding confusion as to the sense in which the word is used. It is not always clear whether reference is made to the sensation or its cause, and the difficulty is more serious for the reason that there is not always a definite relation between the two.

To the ordinary mind the confusion is even greater and the term light is often used to designate the source of light. Unfortunately this misuse of the term is not confined wholly to the non-technical user but, through lack of care or of a definite understanding, we often hear the engineer, the architect, the salesman and solicitor speak of an illuminant as an arc light,—an incandescent light,—a gas light, etc., meaning the source of light. This should be carefully guarded against as it perplexes the public mind and makes it even more difficult to explain technical matters,—a task which is sufficiently embarrassing and laborious without unnecessary complications.

In treating with the public it will be well to carefully draw the distinctions and to consider light, not as a phenomenon of wave motion recognizable as a sensation of the organ of vision, but as *something* we recognize by the sense of sight,—speak of the source as the *illuminant* or *light-source*, and of illumination as the *effect* produced by light falling upon an object or surface and being reflected to the eye. The avoidance of technical terms, as much as possible, will go far toward clearing the "mystery." Watt-hours, candle-feet, efficiency, spherical-candle-power, luminous flux, etc., are unintelligible to the average man, but the same argument, reduced to dollars and cents and to seconds, minutes, hours and days, would be perfectly clear to him and would result in a better understanding and facilitate the introduction of new appliances.

Illumination represents the result of effect of that quantity of light which has been utilized, and the efficiency or economy of any system is directly proportional to the quantity of this utilized light in comparison with the total quantity emitted in all directions from all of the available light-sources.

Fully twenty to twenty-five per cent of all the light used is wasted, owing to the fact that a large proportion is given out by the illuminant in directions in which it is necessary to undergo multitudinous reflections and consequent absorptions before it finally finds its way to the eye. In the vast majority of cases this wasted light serves no useful or artistic purpose and simply indicates that an attempt has been made to accomplish definite results without a knowledge of fundamental principles of the means at hand. A few years ago lack of knowledge regarding illumination was, in a measure, justifiable or excusable, but at the present day, considering that it has been reduced to practically an exact science, poor results show a pitiable lack of interest and judgment which, if displayed in any other line or department, would be considered little short of criminal. It is pathetic to note the painstaking care with which a man will insulate the steam pipes of his heating system to save a small percentage of loss and overlook, in blissful simplicity, a drain on his resources, which may amount to many times the amount saved in heat, due to imperfect illumation.

With the advent of higher efficiency illuminants the proportion of wasted light is being greatly increased. The frantic efforts to "get their money's worth" in

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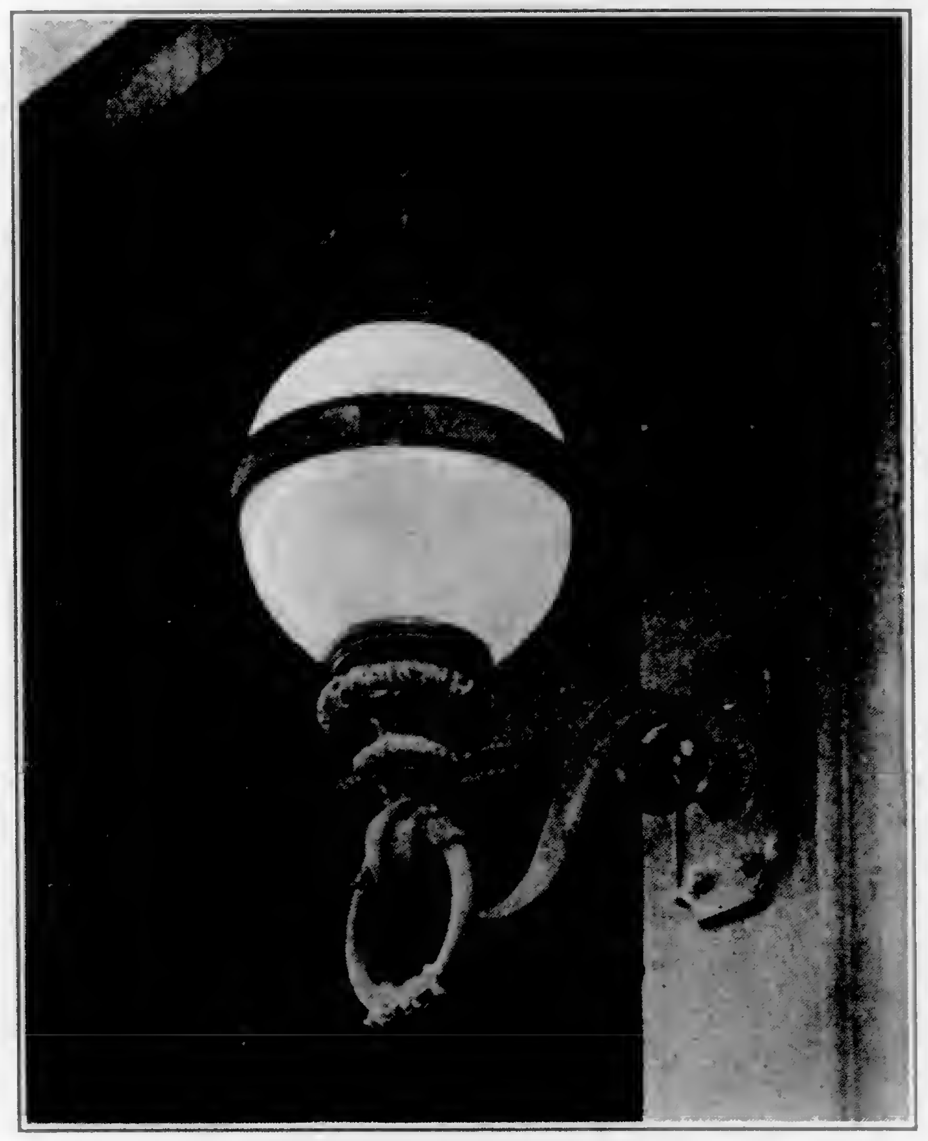
*Mr. Hoar is an illuminating engineer of recognized ability. His office is in the Metropolis Bank building, San Francisco.



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light has caused many a landlord and proprietor, otherwise perfectly sane, to lose sight of the real desideratum—illumination.

For all practical purposes illumination may be defined as the science of utilized light, and divided into three general classes:

(a) Daylight illumination.
(b) Artificial illumination.
(c) Spectacular lighting.

Daylight illumination, as a science, has probably received more consideration and is better understood than that produced by artificial means, though frequently, in its application, there are problems encountered which require a high degree of engineering ability and technical skill. Whole volumes could be written on this subject as it is of vital importance to the very building structure itself. I will pass it, more out of reverence than a desire to slight, with the remark that its consideration constitutes one of the most important functions of the illuminating engineer.

Artificial illumination embraces, in a general way, all interior and exterior lighting where light is used as a medium for rendering objects visible with the least amount of effort or strain to the eyes. Any light in excess of the amount thus required is in the nature of and can only be classed as spectacular, along with outline lighting, sign lighting, etc., etc.

In our consideration of artificial illumination in this article, we will eliminate exterior lighting, and divide the balance of the subject into the following subdivisions:

Intensity—Involving a careful consideration of the intrinsic brilliancy of the light-source itself, and of its proper application—that is to say the character of the room or building to be lighted.

There can be no general rule for determining the amount of light or the intensity required as each problem must be considered individually and the local conditions such as the dimensions of the room and height of ceiling, the use to which the room or building is to be put, the character of the illuminant and the means of distribution, the interior decorations and the general color scheme, must be studied out separately and collectively to determine the right quantity of light. The brilliancy of the general illumination also depends upon whether or not there is to be local lighting at remote and important points.

Quality—In all problems of illumination the quality of the light should be considered both from the standpoint of the determination of color values and from the effect of light on the eye.

The color of an object, as ordinarily understood, is that perceived by the normal eye when viewing the object in white light—as in daylight, consequently the question of color plays an important part in illumination, and the varying proportion of different wave lengths emitted by the light-source must be given special study.

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The spectra of all artificial illuminants differ appreciably from that of daylight and the color tones of a substance when viewed by their direct light may be considerably different from the value ordinarily attributed to it. Reflected light from surrounding objects will be affected by their color and it is often from this cause, rather than from the color value of the light itself, that complaint is heard.

The light obtained from the electric arc differs from pure white light in that the arc emits a superabundance of violet rays which must be filtered out by proper glassware before it can be satisfactorily utilized where the matching of colors is necessary.

The light from the ordinary incandescent carbon filament lamp is of a yellowish white, very agreeable to the eyes and giving a warm and cheerful appearance, but is not suitable where the determination of color values is of importance.

The recent introduction of the tungsten and tantalum lamp offers a happy and timely solution to the perplexing problem. Owing to the high melting point of these metals it is possible to operate the lamps at such a high temperature that they emit practically a pure white light by which even the most delicate shades of color have essentially their daylight values.

Distribution—The question of proper distribution or arrangement of the lighting units is an important factor in the securing of uniform illumination. The possibilities of arrangement is somewhat limited, in practice, owing to the structural details of the building or the interior decorations, but nevertheless this point merits thorough and careful consideration. It should be borne in mind that with a given candle-power better results can be obtained by distributing the lighting units than by concentrating them in large clusters. Or, in other words, more uniform illumination can be secured by incandescent lamps properly distributed than by arc lamps giving the same total quantity of light.

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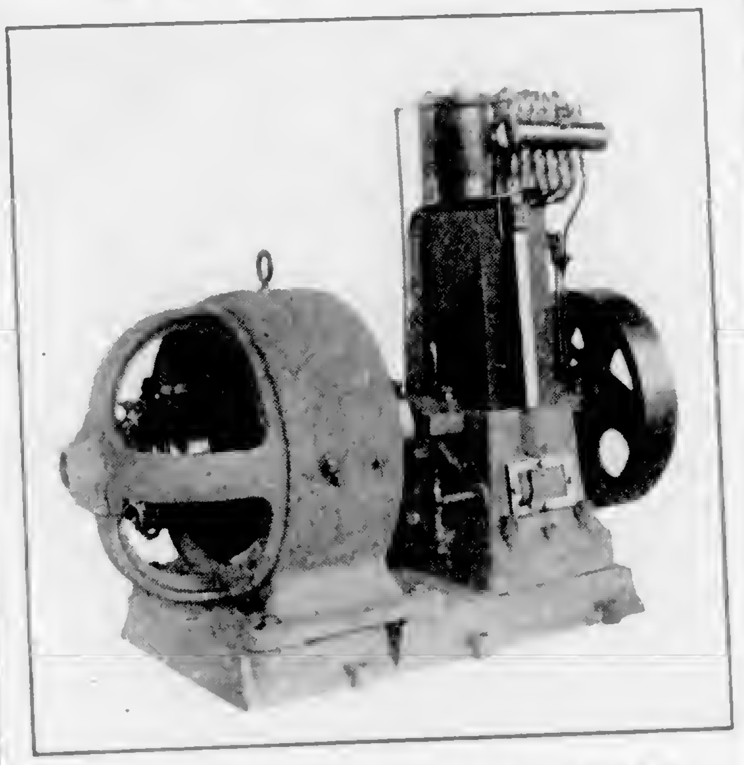

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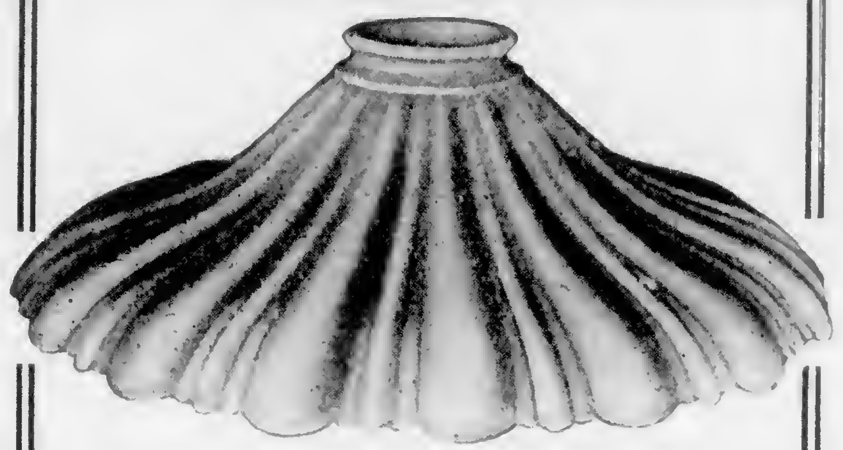

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all modern illuminants is much too great to permit their being installed unprotected in the field of vision. If it were necessary to prove this statement it would only be necessary to point to the number of persons requiring glasses to correct errors in or assist the eye. A properly frosted incandescent lamp bulb will not cut off more than 5 per cent to 7 per cent of the total amount of light, yet to save this small percentage, or we may charitably say through ignorance, thousands of eyes are sacrificed every year. By enclosing the light-source in a frosted or sand-blasted globe or shade the intensely brilliant mantle, filament or crater is concealed and the entire surface of the enclosing globe becomes the radiating surface. The total amount of light is practically the same, but the quantity of light per unit of surface or the intensity of the light is greatly diminished and a soft glow replaces the blinding glare.

From an economic standpoint it will also be necessary to consider the elimination of

shadows by proper diffusion, and the directing of the majority of the light in useful directions by the proper use of reflectors.

Proper use—I have distributed some suggestions as to the proper use of light under the several sub-divisions of the subject, illumination—but the topic is a broad one and I do not wish to minimize its importance by omitting its mention and classification.

Artistic treatment—While illumination is essentially an engineering problem, the opportunity for artistic treatment is practically unlimited, and fixtures and supports for illuminants should be designed to harmonize with their environment in style and finish. As a general rule it will be well for the aspiring young engineer to leave these details to the tender mercies of the fixture manufacturer.

There can be no set rules for the guidance of the student of æsthetics any more than one would attempt to tabulate and reduce to formulæ the impression created in his mind by the mysterious color harmonies from some old stained glass window.

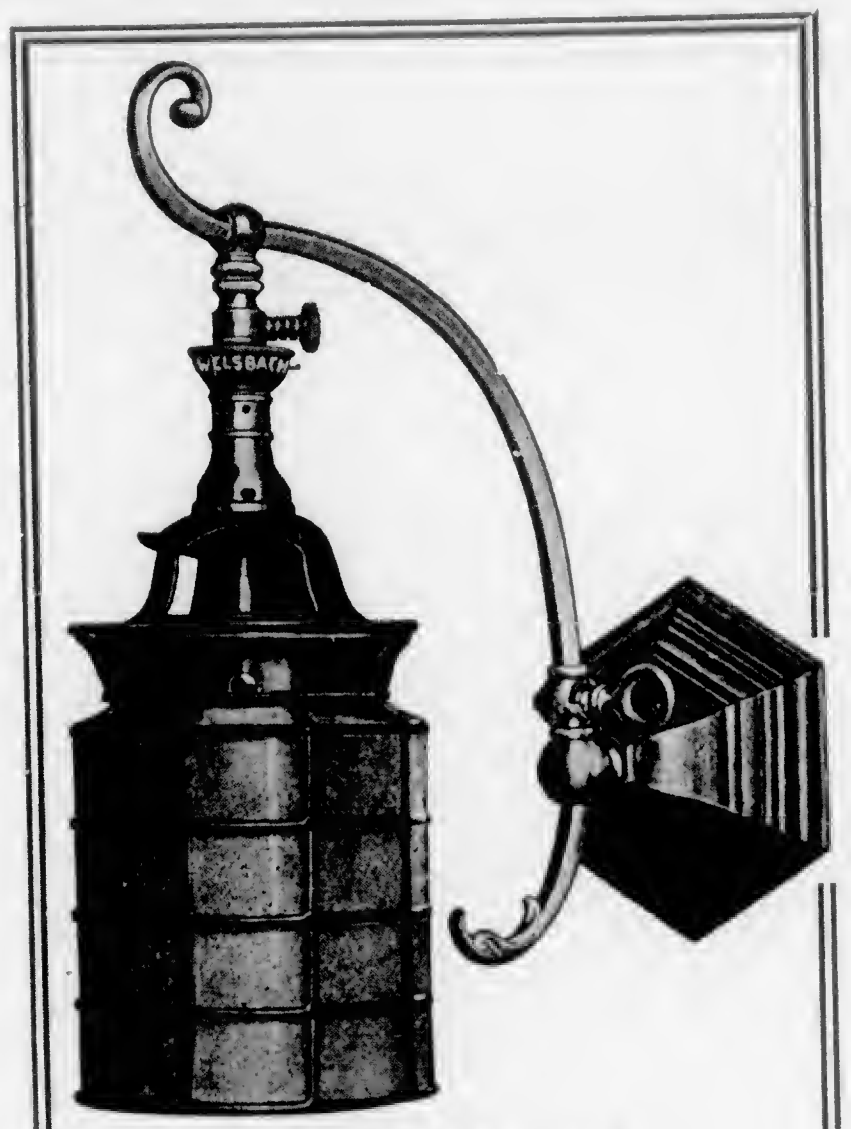
This article has been purposely made devoid of mathematics and algebraic formula and is intended merely to outline, in a general way, the points which must be considered scientifically, practically and artistically by the illuminating engineer.

Have Installed Many Motors

The Engineering and Maintenance Company, of 195 Fremont street, San Francisco, are the exclusive San Francisco agents of the Crocker-Wheeler motors, generators, transformers and accessories. Many of the largest manufacturing and commercial plants in the city have been equipped with power plants by this company, and in every case the installation has proven most satisfactory.

Among the large printing establishments which have been equipped, completely or partially, with modern plants are the Calkins Newspaper Syndicate, the Globe Newspaper Company, Sacramento Union, Phillips & Van Orden Co., Althof & Bahls, Britton & Rey, Schwabacher-Frey Stationery Co., Mysell-Rollins Bank Note Company, Jas. H. Barry Printing Company, California Lithograph Company, Olson Lithograph Company, Shannon-Conmy Press, Geo. D. Graham, and the H. S. Crocker Company.

Large Crocker-Wheeler motors for factory purposes have been installed for A. Schilling & Co., M. J. Brandenstein, J. A. Folger & Company, Tillmann & Bendel Company. Complete power plants have been installed in the Enterprise Brewing Company's new building and the brewery of John Rapp & Sons, Tacoma Bottling Company, and the Olympia Brewing Company. The fine power equipment in the new building of the American Biscuit Company, San Francisco, was installed by the Engineering & Maintenance Company, as was the power machinery in the Municipal plant at Pasadena.



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A New Glass Reflector

By L. R. Hopton.*

UP to within about ten years ago there had been practically no attention given to the utilitarian side of glassware used in connection with artificial lighting. Early scientists, it is true, had worked out mathematically the fundamental problems in connection with utilizing the properties of lenses and prisms in connection with lighting globes and shades, but their labors had resulted in no substantial results. The development of the art of pressing glass, which has been brought to a very high state in America, has made it possible to utilize the optical properties of glass in the construction of accessories for general illumination, and within the past few years globes and reflectors based upon this principle have been brought to a high degree of perfection, and have come largely into use. Notwithstanding the manifest merits of prismatic glass for this purpose, however, it is no unwarranted disparagement to say that it lacks some of the qualities which seem to the writer to be of essential importance in a considerable number of cases. It would indeed be a rare, if not wholly exceptional case, if every excellence were found combined in this single article.

Good illumination, according to the opinion of architects and decorators generally, a considerable proportion of laymen, and, apparently, the majority of illuminating engineers, rests upon considerations of art almost as much as upon those of science. In a recent paper before The Illuminating Engineering Society, Mr. Bassett Jones, Jr., summed up the matter by the statement that "no lighting installation, however efficient it might be in operation, could be called a success that in any way offended the artistic sense;" and from this dictum there seemed to be no dissent. From the artistic view point, prismatic glass, to say the least, has its limitations. From the optical standpoint, furthermore, such glass falls short of perfection. While prismatic globes appear luminous over their entire surface, the luminosity results from a collection of bright spots or surfaces of measurable extent, the intrinsic brilliancy of which is often sufficiently high to cause more or less serious glare. In prismatic reflectors this effect is even greater, especially when used in connection with high efficiency lamps. As compared with opal glass, which realizes theoretically perfect diffusion, prismatic glass leaves much to be desired. Attempts have recently been made to overcome this defect b thinly enameling glass, either on the inner or outer surface, or by roughening it with a sand blast or etching acid; but a moment's consideration of the optical principles involved will show that any such process must seriously interfere with the optical results sought. Again, the difficulty of cleaning glassware having an uneven or roughened surface, and the reduction in efficiency when the surface becomes soiled, is a defect that has not yet been overcome.

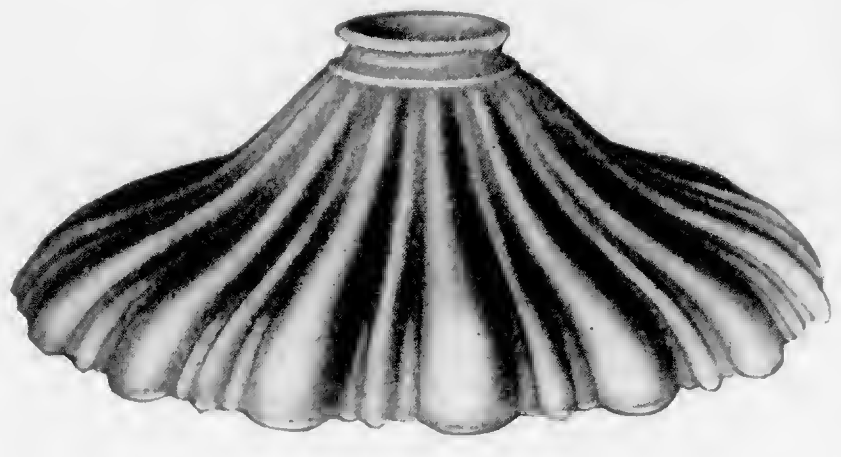

Fig. 1

It was with a view of avoiding these defects, and at the same time retaining to as great an extent as possible the efficiency in lighting results, that the writer, some time ago, began to investigate the subject of glass as applied to lighting accessories.

The several elements going to make up the perfect reflector or globe may be thus stated: Efficiency in resulting illumination; artistic appearance; mechanical stability; ease of cleaning and minimum liability to become soiled; reasonable limits of cost.

Efficiency of illuminating results practically depends upon a redistribution of the rays from the light-source. For this purpose reflection is undoubtedly the better means. Regular reflection, though the most highly efficient, is out of the question where general illumination is required, for various reasons which need not be enumerated here, chief among which is the practical doubling of the glare of the original source. Diffuse, or irregular reflection, then remains as the one available means; in other words, the reflector with a diffusing surface, affords the best means of securing efficiency in light distribution for general illumination. For this purpose dense white opal glass, sand blasted on the reflecting surface, undoubtedly takes the lead; but it has three objections which counterbalance its high reflecting power, namely: the very rapid decrease in reflecting power, by accumulation of soil and dust, opacity, (a reflector for general illumination must transmit a sufficient amount of light to prevent deep shadows above), and a hopelessly inartistic appearance.

Considering all these requisites, opalescent glass, and other means of deadening the surface than sand blasting or ordinary acid etching, were decided upon as the most promising line for experiments. After a considerable number of trials the glass manufacturer succeeded in producing a glass which is perceptibly translucent, but with a diffusing surface on the reflecting side. A new method was devised to produce this surface and it is entirely different from that produced by the ordinary etching, sand-blasting or enameling. While the "glaze" of the glass has been entirely removed, the surface is of such high degree of smoothness that it can be cleaned as readily as that of ordinary glass, and at the same time it does not give sufficient direct reflection to produce perceptible glare. The reflected light from this glass is of a pearly luster, slightly opalescent. The transmitted light shows variations of color running from pale orange to deep sienna. Its general effect is not unlike a polished seashell.

It is of course, impossible to obtain as great a variety of distribution curves with diffuse reflection as with regular reflection. The study of a considerable number of actual problems in illumination, however, convinced the writer that, in the great majority of cases, where the illumination is produced from a number of sources, a distribution curve in which the principal part of the light is included within the angle from the vertical to 60 or 65 degrees fulfills the theoretical conditions within all reasonable limits of accuracy. Except for special lighting, such as desks, tables, etc., the concentrating reflector is theoretically and practically undesirable.

A reflector of this new glass, of the shape indicated in the illustration, Fig. I., gives a distribution curve as shown in Fig. II., which, in a majority of cases, is all that could be desired for general illumination.

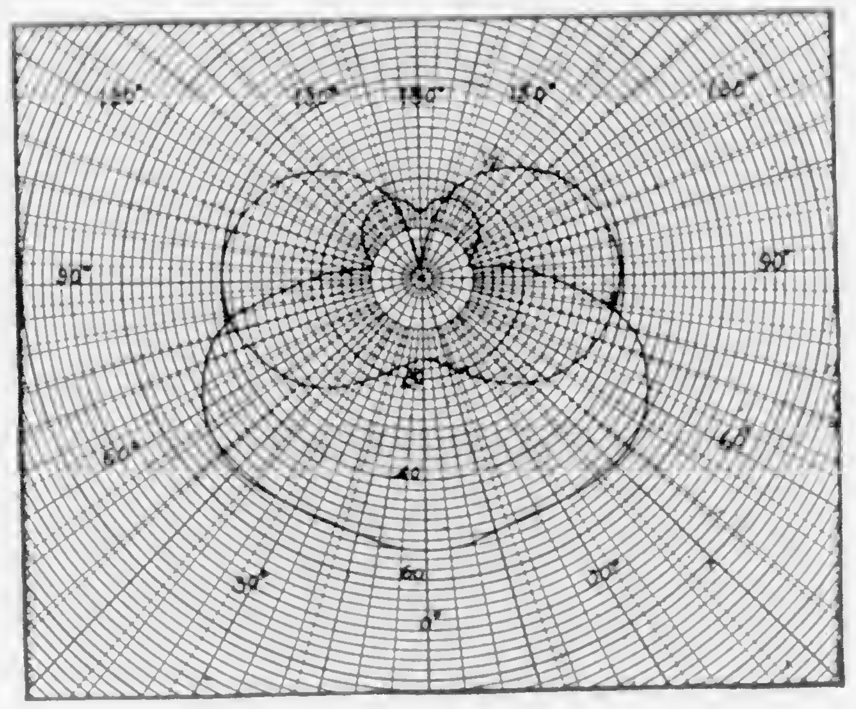

Fig. 2

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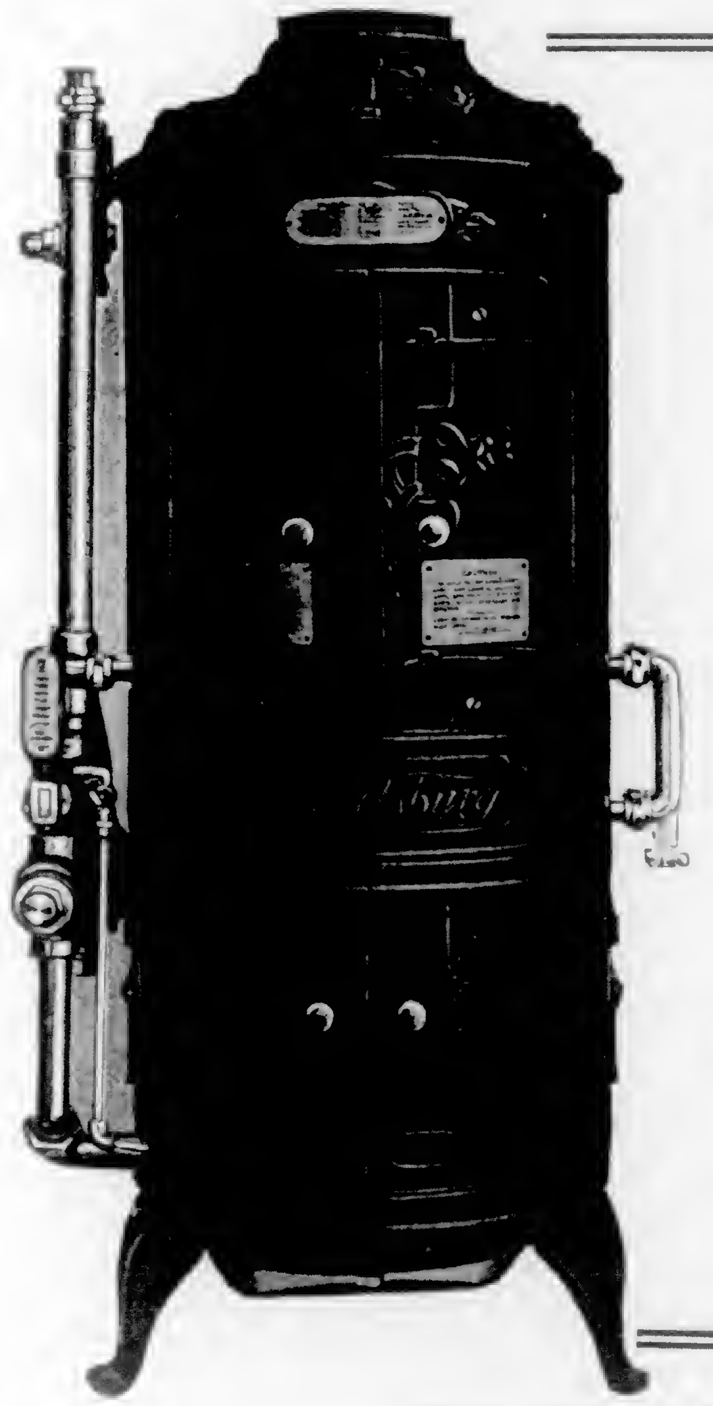
*Mr. Hopton is superintendent of the Enos Company's factory, New York.

Returns From Abroad

Architect John A. Walls, who, with his family, has been sojourning in Europe for the past six months, has returned to Los Angeles. During his absence he visited the principal cities and resorts of the old world, and returns fully equipped with information relative to the various sections he visited.



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By the Way

Some Industrial Information Worth the While

Los Angeles Pressed Brick Company

The Los Angeles Pressed Brick Company recently has shipped several carloads of vitrified paving brick to San Francisco for the Anheuser Busch Brewing Company. The same company is in correspondence with the Board of Public Works of Oakland in regard to using paving brick for both gutters and street work and it is very probable they will decide to follow the Eastern cities that have adopted brick almost altogether after an experience of years in brick and all other kinds of paving.

The Los Angeles company has just made its first shipment of mat-glazed brick for the Hewes building, Market and Sixth streets, San Francisco. This is entirely different from anything yet seen in San Francisco and will make a distinctive and very attractive building.

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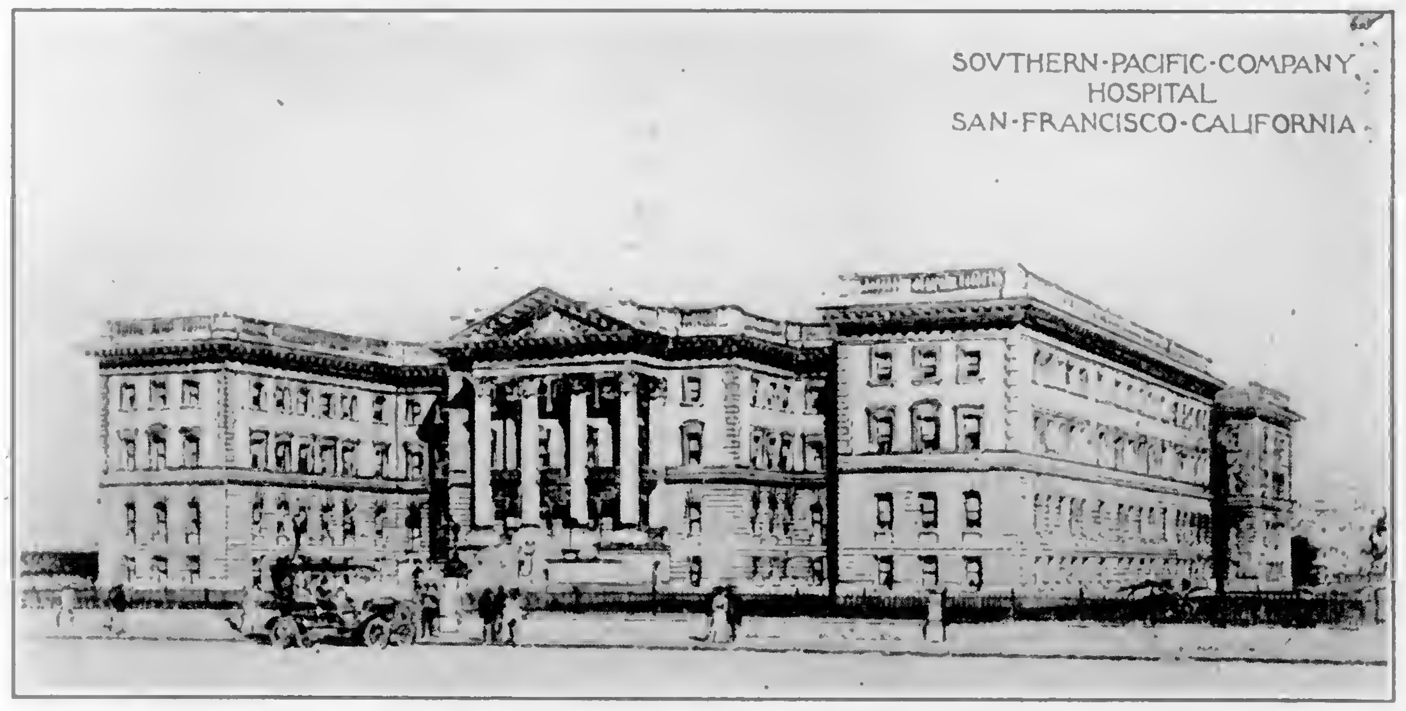

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California Marble for Palace Hotel

The Californians who are wont to encourage home product doubtless will be pleased to learn that the Palace hotel architects, Messrs. Trowbridge & Livingston, have selected Baxter black marble for the new Palace hotel. The Baxter marble quarries are in California and some of the specimens that have been taken from it have been pronounced as beautiful and perfect as imported marble. The order includes about 12,000 feet of black marble which will be used as a base for the white marble, which will be a conspicuous feature of the great corridors and entrance vestibules. Baxter marble has been used exclusively in the handsome Bellevue hotel in San Francisco, and those who have seen it are enthusiastic in praising it.

Big Order for Metal Frames

One of the largest orders for metal window frames and doors given out since the fire in San Francisco two years ago, was recently awarded to Fred Nichols, the well-known fireproof door manufacturer in East Oakland. The contract came from the office of Coxhead and Coxhead, Architects, and was for ninety-one frames, some as large as ten feet six inches by seven feet, to be installed in the handsome six-story exchange building of the Home Telephone Company, now under construction, on Grant avenue. The building is designed to be the company's central exchange. It is Class A, steel frame, concrete floors and walls and stone front and its estimated cost is between $200,000 and $300,000. The Nichols contract alone runs close to $30,000. Mr. Nichols enjoys the distinction of being the pioneer manufacturer of metal fireproof doors in California and most of the machines now being used in turning out metal frames were either designed or manufactured by him or patterned after his invention. Mr. Nichols was formerly located in Los Angeles. He is an expert sheet metal worker by trade and an all round mechanic.

Mr. Nichols recently was awarded the gold medal for the best metal door exhibit at the State fair in Sacramento. He will have a similar exhibit at the coming Seattle exposition. Mr. Nichols is utilizing his spare moments in putting together an automobile of his own design and when finished it is said there will be no touring car on the Coast any better. If the car is a success, as he expects it will be, Mr. Nichols may go into the manufacture of them and he has already received assurance of ample financial backing from well-known San Francisco and Oakland capitalists.

Builds Fine Residences

The Calwell-Young Company of San Mateo has built some of the finest residences in San Mateo county, including those of A. C. Boulderson and Samuel Abrams and the San Mateo Club house. The firm has at present under construction the Easton school house and a handsome residence for W. H. Singer of Burlingame.

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The Tayler & Spotswood Company, dealers in iron, steel and structural material, have on hand for immediate shipment, steel bars of all sizes for reinforced concrete. The bars used for reinforcing the concrete in the new Agnew Hospital buildings were supplied by this company and a number of other large orders have lately been filled by them. They are also importers and dealers in refined iron, soft steel, angles, channels, I beams, etc. Tayler & Spotswood's office and warehouses are at Minnesota and Nineteenth streets, San Francisco.

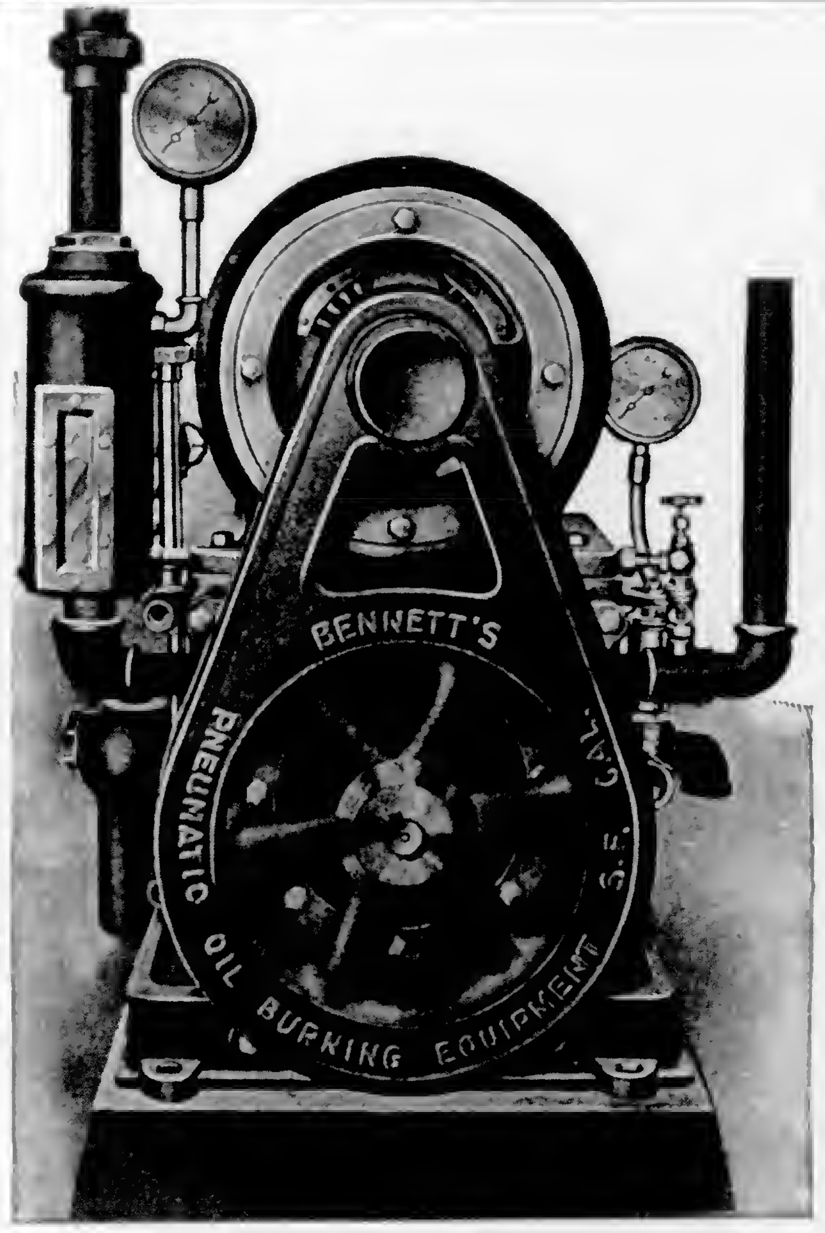
Electrical Contractors Busy

The California Electrical Construction Company, 680 Mission street, San Francisco, is doing all the electrical work in the new W. P. Fuller building, Beale street, San Francisco. The same company has recently finished wiring the Howard street Methodist church, McCall & Wythe of Oakland, architects, and the San Jose branch of the same company has the contract for all the electrical work in the new Masonic temple in the Garden City. High class workmanship and prompt attention to all contracts, no matter how large or how small, is the secret of this firm's splendid success.

Hoyt Bros. Finish Carnegie Libraries

Hoyt Bros., Santa Rosa contractors, have recently completed two handsome Carnegie library buildings, one at St. Helena, W. W. Wilson, architect, and the other at San Rafael, Reid Bros., architects. Both are very pretty buildings and the excellent work of the contractors has called forth much favorable comment, not only from the architects but from those most interested in the construction of the buildings and the public in general. The same firm has recently taken a contract for the erection of a one-story building for the Rosenberg-Green Company in Santa Rosa and for two bungalows in the same city. The business building is to be faced with Golden Gate sandstone brick.

Hoyt Brothers have been in the contracting business in Santa Rosa for the past five years, and for the past three years have constructed an annual average of $150,000 worth of buildings, which includes the grammar school at Sebastopol, at a cost of $21,000; a four-story brick, corner Eddy and Leavenworth streets in San Francisco, costing $52,000; a reinforced concrete building in San Francisco, costing $40,000; the Bank of Cloverdale building; the White House, a large store in Santa Rosa, and many other fine structures.



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These shingles stand up against any fire test that can be devised. Heated to a glowing red and quenched with cold water, they do not chip or crack, even at the nail holes, proving the perfect safety of a roof when deluged by a fire engine.

Asbestos "Century" Shingles are a positive protection from sparks, or burning matter of any kind falling on the roof, which is the cause of one-fifth the fires the country over. Even blazing timbers from a neighboring fire do not crack the shingles, and they burn themselves out harmlessly.

In all locations where sparks are frequent, as alongside railroads, Asbestos "Century" Shingles form the one absolute safeguard against fire—a fact of which the railroads themselves are taking advantage by roofing and sheathing their frame buildings with these shingles.

So much for protection from fires outside the building. There is another phase—service done by these Asbestos "Century" Shingles in confining a fire to the building where it originated. Unaffected by the flames, these shingles keep the roof intact and so help to smother the flames. A recently invented device, which holds the tips of the shingles together while allowing individual expansion and contraction, makes the shingles self-supporting should the roof frames be burned away.. What this means in preventing the spread of fire need not be emphasized.

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Many Buildings Have Kahn System

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Concrete Telegraph Poles

The Pennsylvania Railroad Company has erected on a long stretch of its right of way between Pittsburg and Chicago concrete telegraph poles to replace the usual wooden poles.

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Collins' System Metal Partitions, Ceilings, Furring and Lathing done by The San Francisco Fireproofing Company

Improved Methods in Fireproofing

Probably greater strides in fireproof construction have been made in San Francisco than in any other city in the country. Since the great fire the very best engineering skill has been brought forward to create a system of construction which will be absolutely fire-resisting.

One of the ablest exponents of this class of construction is the San Francisco Fire Proofing Company, owner of the Collins' system. This company has put its system of metal partitions, ceiling, and wall furring in the most prominent Class A buildings which have been constructed in San Francisco within the past two years. That this company's system is of the highest character is evidenced by the class of buildings in which their partitions have been installed, viz.: the Mills building and the Chronicle building, in which all the terra cotta partitions were taken out and the Collins' steel studding substituted. The First National Bank building, also the Wells Fargo building and Wilson building used Collins' metal studding exclusively for all partitions, ceiling, and wall furring.

The metal partition manufactured by this company has many points of superiority over any other system on the market. The studding is made of hoop steel in channel form, 16 to 20 gauge. Absolute rigidity is assured, on account of the fact that the metal stud is united and thoroughly braced by their system.

Slots are cut in the stud and the metal from the slot is used to form a horizontal brace, which, attached to the next stud, and when erected, forms a united partition, perfectly braced throughout. The slot also affords a passage for electric wire conduits, gas, and water pipes. Wood blocks may also be inserted in the slots to hold grounds for moldings, base boards, and chair rails. The partition is also absolutely sound proof, the slot in the middle distributing the sound throughout the entire partition.

A point not to be overlooked is the comparative lightness of this steel partition, weighing very much less than other walls of the same thickness. The one property of fireproof construction, which is almost as important as the fire-resisting quality in the tall buildings now being erected all over the country, is that of weight, as it is especially desirable in skeleton steel construction to reduce the dead weight to a minimum. The difference in weight by the use of their metal studding, as compared to terra cotta and tile, is very great. This style of steel construction is also a great resister of earthquakes, being able to resist a twisting strain from the fact of its being a united body.

Mr. Collins, the inventor of the Collins' metal studding, which is owned and controlled exclusively by this company, was one of the pioneers in the use of steel for partitions, and his long experience has been of great benefit in bringing the system referred to to the highest degree of perfection.

Fine Oil Plant for the Emporium

The California Oil Burner Company, of 717 Market street, San Francisco, is just completing a contract of furnishing all the oil burning machinery and a large air atomizing compressor outfit for starting the fires in the high and low pressure boilers in the Emporium building.

The California's machines are the neatest and most noiseless of any called to our attention in the new buildings recently erected in San Francisco, and the system designed for the Emporium will undoubtedly become very popular, because a fireman in starting up in the morning has but to operate an electric switch, which controls the compressor plant that furnishes sufficient compressed air to thoroughly atomize the oil, and after he has sufficient steam for this purpose a lever operates the steam line and shuts down the compressor. A rotary oil pump, besides furnishing oil to start upon, raises the pressure in the steam pumps to normal, so there is no variation in pressure. The above system is a big time saver and is much cleaner than the old method.

The California Oil Burner Company is also completing contracts in the Postal Telegraph building, Maskey building, McGregor apartment house and Masonic Temple. They also report having just completed plants in the Bank of California, Bank of Italy, Clunie building and Jewelers building.

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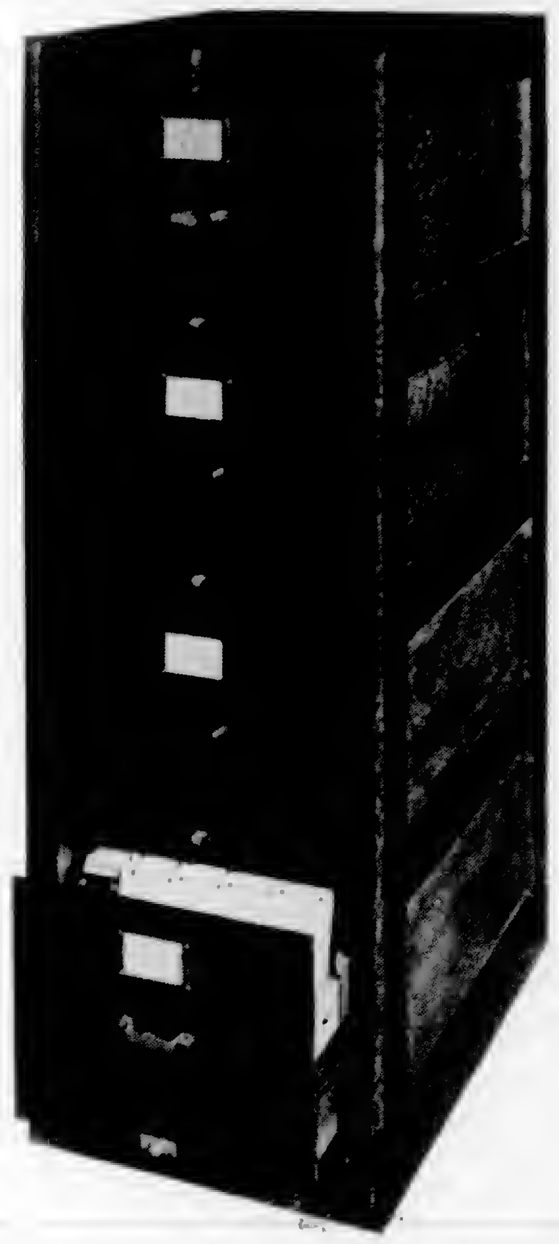

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William Ernst, manufacturer of the Golden Gate oil burners and the Atlas tube cleaners for water tube boilers, reports a steady demand for his goods and his factory at 203 Main street, San Francisco, has been running on full time throughout the summer months. Mr. Ernst's oil burning system is in use by the following and in every case the burners are giving excellent satisfaction: Union Square hotel, Poodle Dog restaurant, Pacific building, West Bank building, Argonaut hotel, Pioneer building, North Star brewery, New York malt house, Emporium building, Southern Pacific Company, Mare Island Navy Yard, J. J. Dowling, Flynn & Tracey and Louston's laundry. Among the contractors who use the Golden Gate burners are the Healy-Tibbitts Company and the California Hydraulic and Engineering Company.

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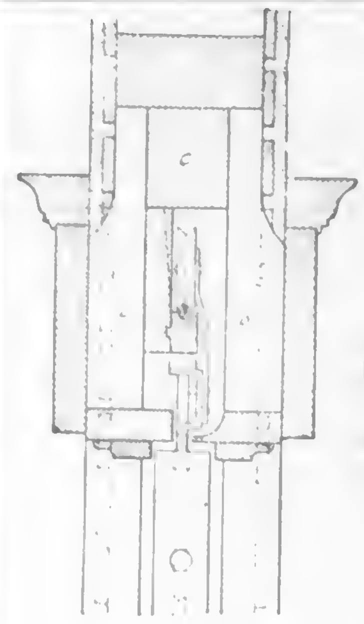

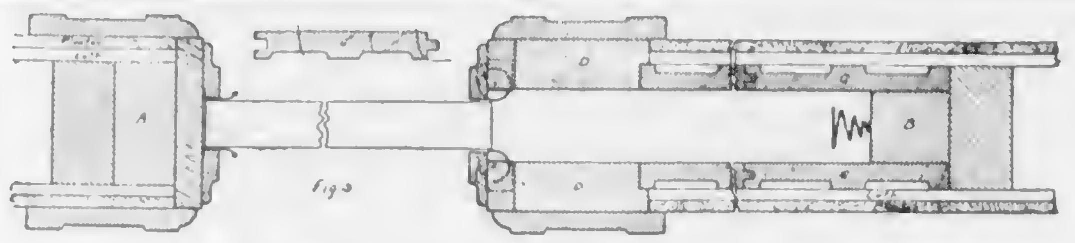

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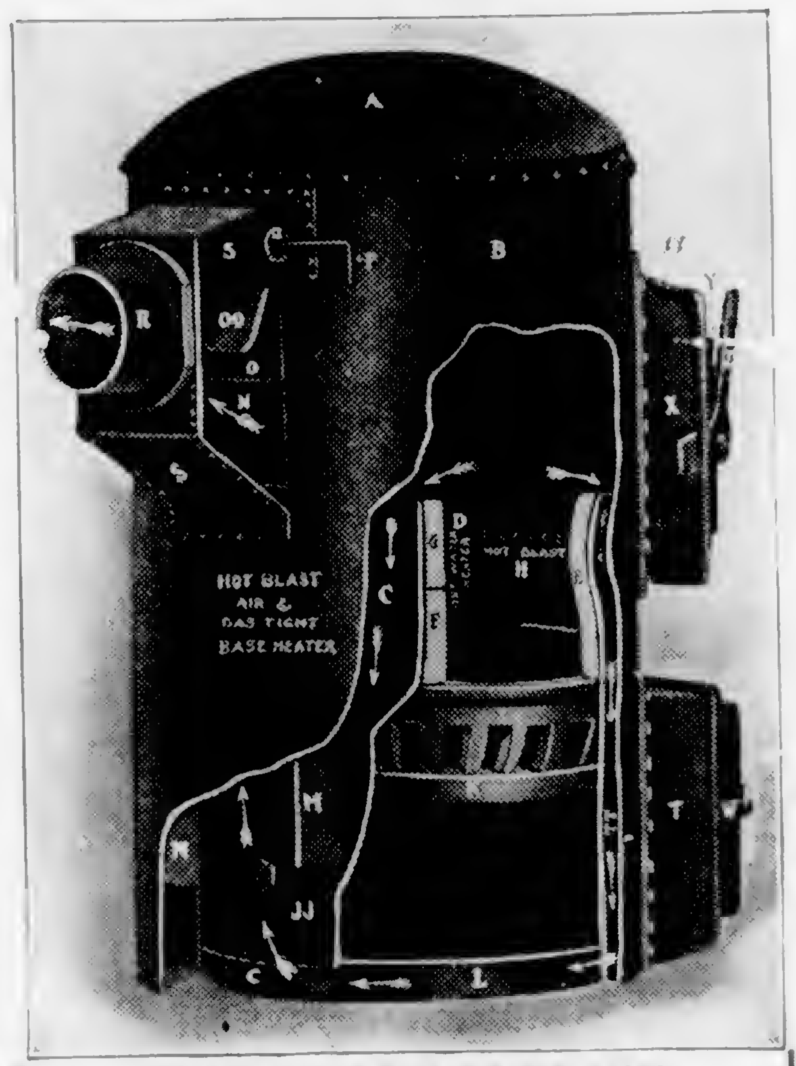

THE QUAKER FURNACE

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Spiral Chutes

The Haslett Warehouse Company of San Francisco is having a great many inquiries for its new spiral chute, which recently has been patented and placed on the market. A number of buildings in San Francisco have been equipped with the chute, and the reports of the owners of these buildings are most favorable for the Haslett invention. The chute has been devised to meet the requirements of wholesale business houses, where it is desired to deliver goods from the upper floors of a building to the lower floors without great expense or loss of time. The chute solves the problem for any height of building. Goods may be delivered to the ground floor from the highest upper floors at the same speed as from one floor above the street.

The spiral chute possesses advantages over the straight chute in that it is not necessary to wait for signals after sending one package down, before another can be started. Packages may be placed in the chute one after another, as fast as they can be handled, and if not removed at the bottom as fast as sent down, the packages will back up, and the whole line move down as rapidly as the bundles are removed at the bottom.

The capacity of the chute is very great. For illustration, the Haslett Warehouse Company has delivered to teams in the street sacks of beans weighing on the average 90 pounds each, at the rate of 1400 per hour.

Among the advantages of the system are low first-cost, practically no cost for maintenance, large delivery capacity, small space occupied in building, no power required, no time lost by employes, and a very great saving in labor.

The chutes can be designed to meet all conditions. The chute trough is made of steel galvanized, and the supporting posts and brackets may be either or iron, wood, or reinforced concrete. For warehouse purposes, the chute may be built to deliver outside the building, so that freight can be delivered to cars or teams without interference.

Among the buildings where spiral chutes are now in operation are those owned by the following: Langley & Michaels Co., J. H. Newbauer & Co., Getz Bros. & Co., M. J. Brandenstein & Co., Tillmann & Bendel, Haas Bros., Southern Pacific Warehouses, Gibraltar Warehouse, Security Warehouses.

The offices of The Haslett Warehouse Company are at 310 California street, San Francisco.

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Fine Vacuum Cleaning Plant for Palace Hotel

A feature of San Francisco's new Palace hotel will be a complete vacuum cleaning system to be installed by the Vacuum Engineering Company of San Francisco, New York, Philadelphia, and Chicago. The plant will be what is known as the eight sweeper capacity, and is so constructed that it can be increased to sixteen sweeper capacity if needed. The basement and first floor will be equipped with a combination scrubbing, mopping and dry cleaning plant, while the upper floors will have the regulation dry cleaning apparatus. The plant will have 136 inlets or valves from which sweepers may be operated, and eight of these valves may be used simultaneously.

With dust as one of the greatest of disease germ propagators, great care should be taken to remove and not merely disturb it in one part of a room only to allow it to settle in another. That was the old way, before modern mechanical ingenuity suggested the idea of forming a vacuum, and by means of a rubber tube sucking the dust and disposing of it. This has been done successfully for some years, there being a gradual mechanical improvement in the apparatus used. Until the advent of the system here described the dust was drawn into what is known as a separating tank, first passing through several screens. These had to be cleared and the receptable frequently emptied, a process both unsanitary and laborious.

The new way, patented by the Vacuum Engineering Company, consists of an ingenious arrangement, by which the separating tanks are eliminated, the dust is passed through the pump into a waste pipe, whence it goes directly into the sewer without coming in contact with the atmosphere. There are no bulky receptacles, and the disposal of the dust, or dirty water in case of scrubbing, is automatic. This solves an important problem long neglected by engineers, who have given their chief attention to the subject of the automatic gathering of dust rather than to its automatic disposal. The economic advantages are, therefore, the small amount of space required and the low cost of operation, as the plant may be left undisturbed two months if necessary, or more.

The special features of this invention make it possible, without much extra cost, to use either a wet or dry system. In non-technical language, the same pipes and flexible tubes which convey the dust from the rooms of a building where the system is installed will carry water. Attaching special scrubbing implements to the operator's air broom, marble, tiled, mosaic or hardwood floors may be readily scrubbed. This done, the water is turned off and the dirty water is sucked by vacuum downstairs into the pump, and through it to the sewer. Thus it would seem that as concerns large office or public buildings the scrub-woman will have to change her vocation, and housemaid's knee will soon become a disease of the crude past.

This vacuum cleaning system is in operation in the Standard Oil building, New York; in the Second National Bank building, New York; in the Union Railway Terminal Station, Washington; in the Massachusetts Mutual Life building, Springfield, Mass., and is now being installed in the National City Bank building, New York City, designed by McKinn, Mead & White, architects.

The San Francisco office of the Vacuum Engineering Company is on the seventh floor of the Monadnock building, and is in charge of Mr. F. R. Wheeler, Pacific Coast manager.

Largest Office Building in the World

Plans recently perfected contemplate the erection on a site fronting on West and Washington streets, New York City, of what, as regards square-foot area, will be the largest office building in the world. It will represent an investment of over $4,000,000.

Some architects who have studied the plans say that this thirty-five-story office building will completely change the skyline of the lower part of old New York from steamships in the lower bay. Now the tower of the Singer building, the ornamental roof of the City Investing building and the upper stories of the Trinity and the West street buildings form the main objects in that perspective. As they are almost directly north of the site of the proposed annex to the Whitehall building, the view of those structures from steamships in the lower bay will be cut off by the annex, it is said. The plot to be improved comprises 52,000 square feet.

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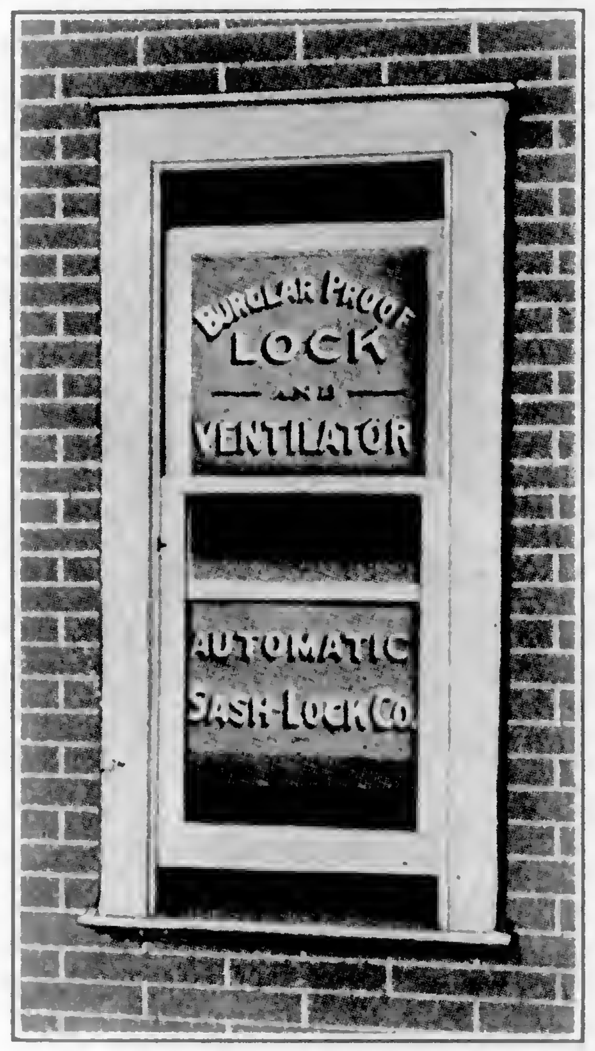

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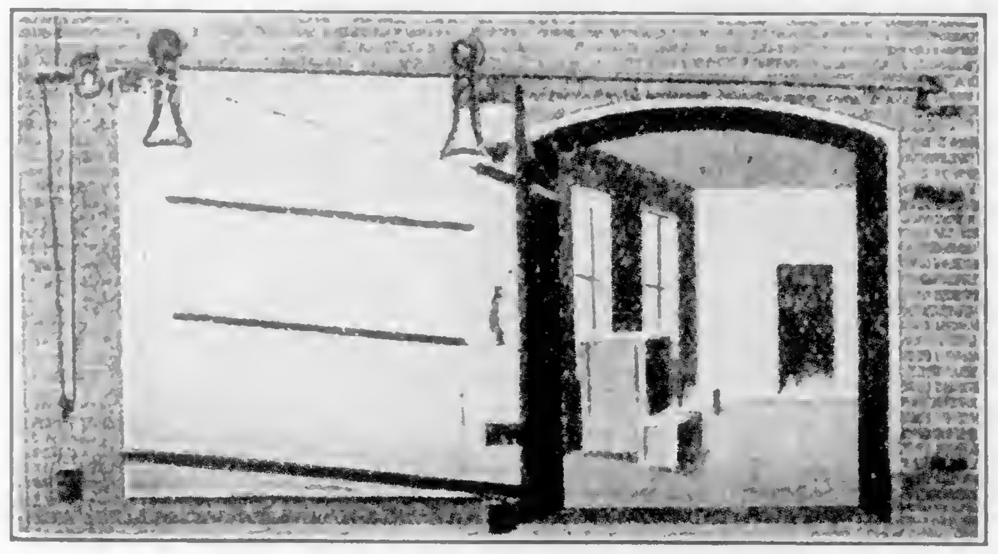

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Many manufacturers have endeavored to produce the results attained by Mr. Wm. T. Cottier, who has devoted the past thirty years to the perfection of the Cottier system of ventilation, a system which is now perfect in every detail, from the chimney cap to the car ventilator.

Few ventilators are good excluders of weather, and at the same time good acelarators of ventilation. Most of them permit the wind to enter the ventilator, causing back drafts, thereby destroying the effectiveness of the exhaust capacity. Cottier ventilators are absolutely weather-proof and are far superior in exhaust capacity to any other ventilator on the market today.

The United States mint at San Francisco desired ventilators to remove the obnoxious gases which arise from the gold and silver precipitating tables, they required that the ventilators be constructed of redwood throughout, as no metal could withstand the action of the acid gases. The Cottier Ventilating Company were the successful bidders for this work, as the Cottier was recognized as the superior exhaust ventilator. Several large Cottier ventilators constructed of wood were installed.

The Atchison, Topeka and Santa Fe R. R. Co., who occupy offices on the ground floor of the Monadnock building, desired ventilation through the several large skylights in the entirely enclosed light court of this ten-story building. The Cottier Ventilating Company placed eight ridge ventilators on the skylights and the officials of the Santa Fe office are highly gratified with the results obtained, which they say are far better than they anticipated.

Perhaps no better proof of the thoroughness of the system, and the effectiveness in performing the work, can be given than the fact that the Cottier system has been adopted as the standard of ventilation by the Oregon Railway and Navigation Company, Great Northern Union Pacific Oregon Short Line, and all the Harriman railway and ship lines.

Through a test conducted at the Metropolis Bank building, San Francisco, by Mr. Wm. E. Leland, S. B., consulting engineer, of the Cottier ventilators, the Cottier proved to be far superior to other ventilators, both in the amount of air handled and the liability to down or back drafts

Mr. Wallace Locates in San Francisco

S. T. Wallace, formerly with the Wallace, Lindesmith Hoist Company of Los Angeles, is now associated with the L. E. Boyle Company, Incorporated, which company recently moved from the Monadnock building to spacious offices at the corner of Front and Pine streets, San Francisco. The new location affords splendid show room facilities. The company is agent for the Wallace hoist, the Kanawha chemical engine, etc. A chemical engine recently was sold to the city of Berkeley and a smaller machine is on trial at Melrose.

Salt Lake City Has Concrete Craze

The reinforced concrete craze has reached Salt Lake City, and it is reported that no less than a half dozen pretentious buildings of this material will be constructed there within the next twelve months. Vonder Horst Bros. of San Francisco, contractors of the new Tourist hotel in Stockton, recently received the contract for building a seven-story concrete office building in Salt Lake for Mr. McIntyre. Work has already been started.

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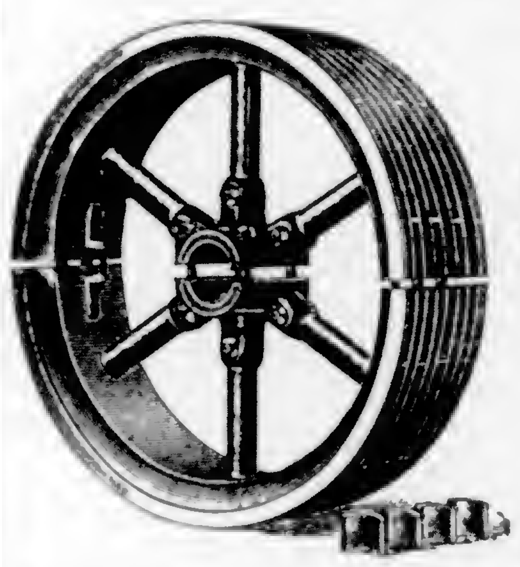

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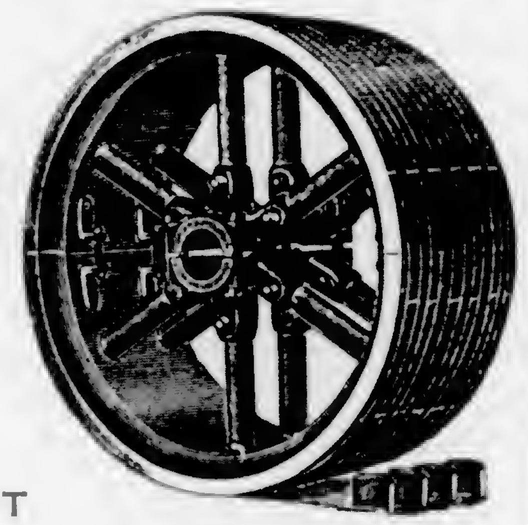

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Successful Cornice Firm

Comyns & Nygren, sheet metal workers, at 1731 Fifteenth street, San Francisco, have recently taken the contract for the cornice work, galvanized iron skylights, and metal fire doors in the new White garage, now under construction at the corner of Market street and Van Ness avenue. The contract, which amounts to about $2200, was sublet to Comyns & Nygren by the Healy-Tibbitts Construction Company. Other important contracts that have been taken by these well known sheet metal workers are the Tillmann & Bendel building, the China Basin warehouses of Barneson-Hibbard, the Union League Club at Powell and O'Farrell streets, and all the metal windows and galvanized iron cornice work in the new buildings of the California Wine Association, at Wine Haven.

The Largest Building in the United States

The Coliseum at St. Louis, the cornerstone of which was laid recently, is believed to be the largest public building in the United States, and among the largest in the world.

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Send Building Inspector East

J. J. Backus, Superintendent of Buildings in Los Angeles, is enjoying a six weeks leave of absence, having been granted the same with $400 expense money, by the Los Angeles City Council which believes that the Superintendent can gather new ideas in his travels and use them to good advantage in his home city. Backus will inspect many of the new municipal and state buildings in the Eastern cities. The Southern California Chapter of the American Institute of Architects, has indorsed the action of the City Council and has recommended an annual tour for the building superintendent.

Roofing Contractors Busy

The H. D. Samuel Company, 23 Valencia street, San Francisco, report a good demand for the Paraffine Paint Company's Malthoid roofing. Recent roofing contracts filled with the Samuels Company include the following buildings: St. Francis Hotel, Fairmont Hotel, Shreve building, Muirhead building, Market and Larkin streets; Morton L. Cook building, Second and Minna streets; Friedman furniture warehouse, O'Farrell street; McCreary building, Pine and Davis streets; Pacific Portland Cement building, at Cement, Cal.; Douglas building, San Jose; also waterproofing the Baker & Hamilton building, the Byron Jackson building, at Second and Natoma streets, and the Crocker Estate building, at First and Mission streets.

Salt Lake Establishes New Precedent

Salt Lake City has established a precedent by accepting a bid for public work thirty minutes after the time stated in the official advertisement. Contract for the work was not let at the session of the Board of Public Works, and the bid may still be rejected. The late bid was for street improvements, and happened to be the lowest, aggregating $15,000. P. J. Moran, who has been doing public contracting in that city for twenty years, is protesting strenuously against allowing the bid to stand. His was the next lowest.

Heavy Tools

The Pacific Iron Works at the east end of the Burnside-street bridge, Portland, have just received from the East a very heavy punch weighing eight and one-half tons for punching heavy plates. This tool will punch one and a half-inch holes in one and a half-inch thick plates. They have also received a thirty-six-inch circular saw for cutting the largest steel beams rolled. Both these machines will be driven by independent motors attached to the machines and will be installed immediately. These works are being equipped to do the heaviest kind of construction work.

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Concrete Test in Portland

Assistant Building Inspector Orin Backus of Portland recently subjected the first floor of the new reinforced concrete I. O. O. F. temple at East Sixth and East Alder streets, Portland, to a very severe test. A pile, 16 feet square, containing 21,000 brick, were piled upon the concrete floor, equalling a dead weight of 375 pounds to the square foot. The concrete had been in place for 60 days. It is a credit to the foresight of Architect C. J. Berndt and the constructive ability of the contractors, Litherland & Abrey, that the floor stood the test perfectly. The weight was greater than the floor is ever liable to sustain again. This is the first public test of concrete floors that the building inspector has made in Portland, but from this time forward it is to become the established rule.

San Francisco Chapter, A. I. A.

The San Francisco Chapter of the American Institute of Architects held its annual meeting at Tait's cafe on Thursday evening, October 15th. The meeting was preceded by an enjoyable dinner and was followed bv the principal business of the meeting, the election of officers for the ensuing year. The result was the re-election of Albert Pissis as president; William Mooser, vice-president; Sylvain Schnaittacher, secretary and treasurer; Henry A. Schulze and William Curlett, trustees.

After an informal discussion of matters of interest to the profession, the meeting adjourned.

A Valuable Office Boy

The employer was bending over a table, looking at the directory. The new office boy slipped up quietly and poked a note into his hand. The surprised employer opened it, and read:

"Honored Sir: Yer pants is ripped."

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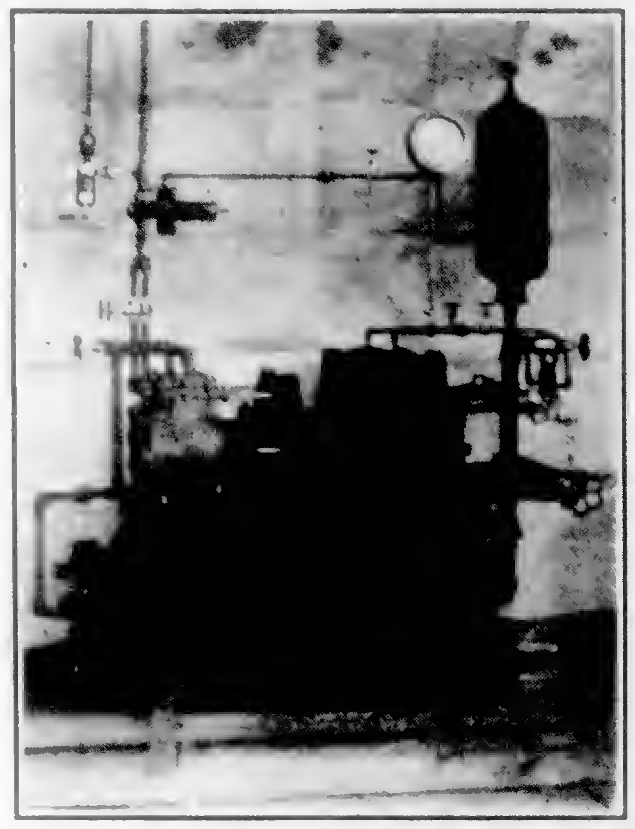

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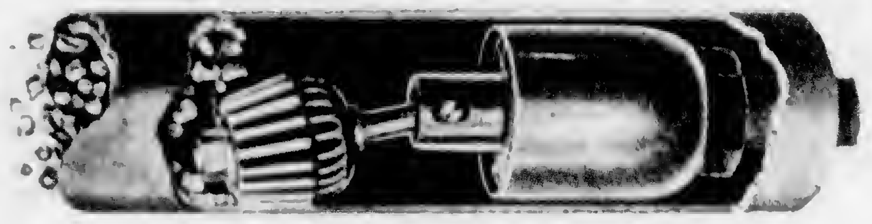

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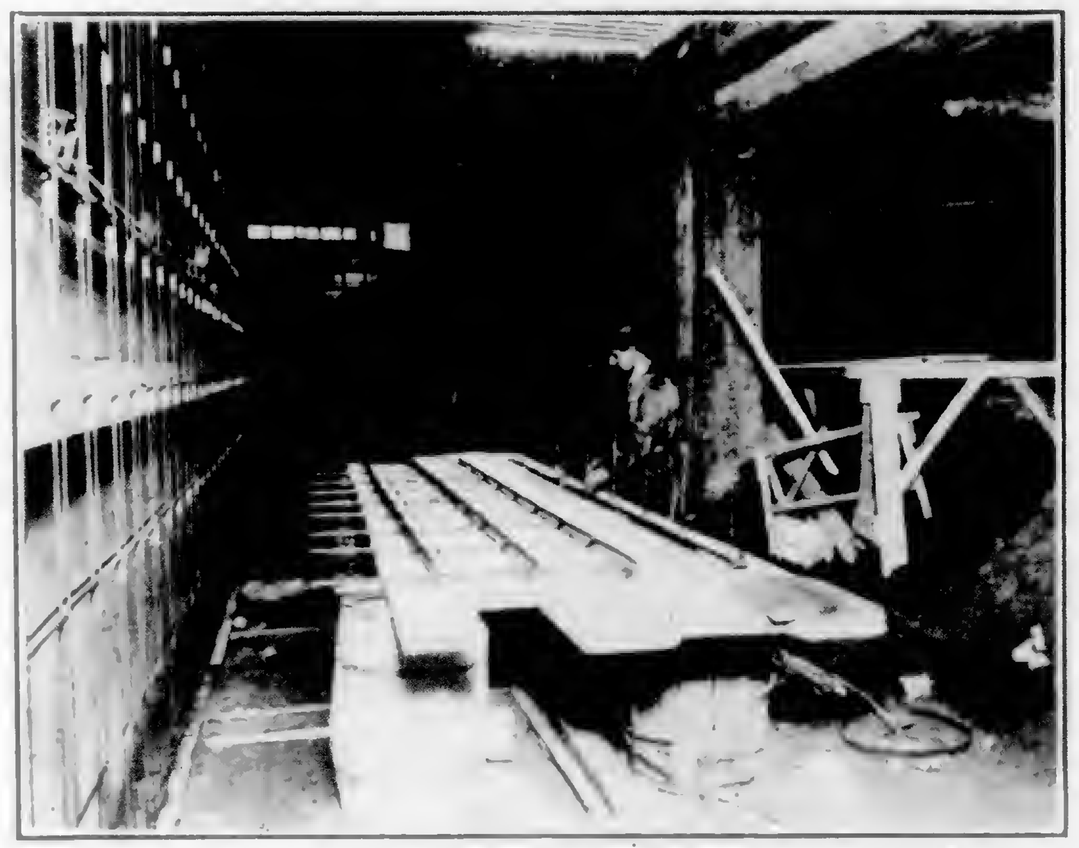

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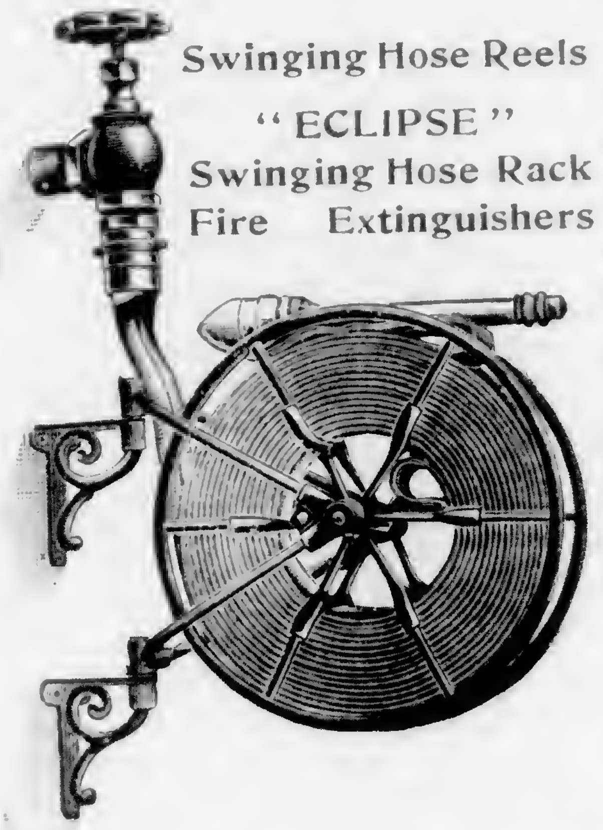

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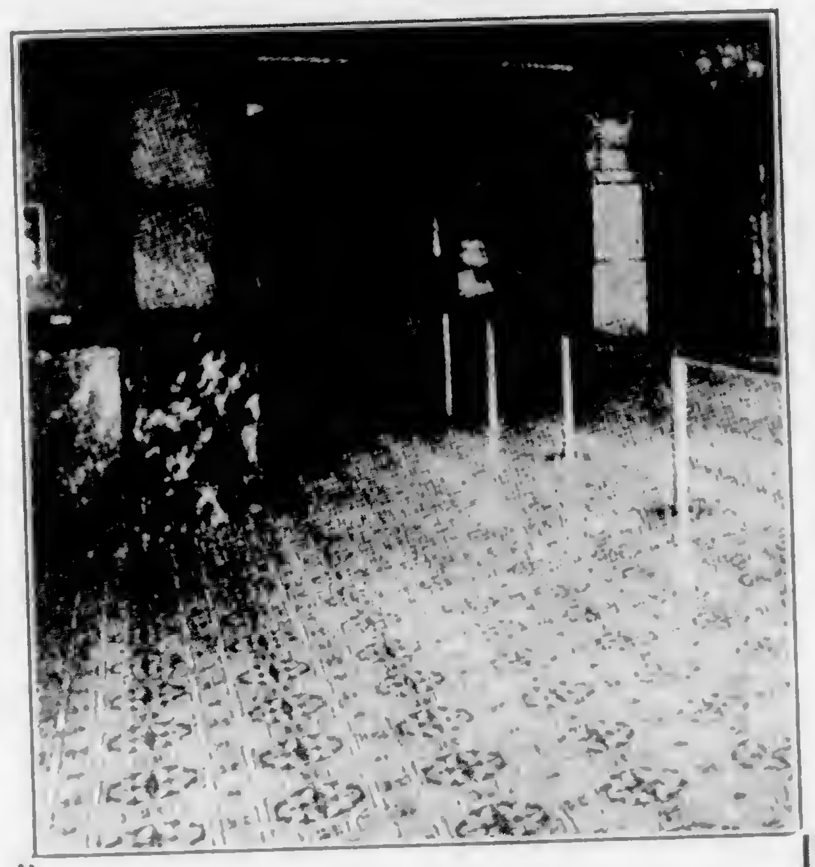

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In an architectural competition for branch library buildings recently held in Seattle, Wash., thirty-three sets of sketches and drawings were submitted to the Library Board, all by Seattle architects. It is proposed to build three buildings, at a cost of $35,000 each, the gift of Mr. Carnegie. Architect John Galen Howard, of the University of California, Mr. William R. Ware or Mr. F. W. Chandler are called on by the board to act as advisers on the designs submitted.

Moves to Portland

Architect W. W. Oates, formerly of San Francisco, has moved to Portland, where he will continue to practice the profession.

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A Characteristic Southwestern Bungalow

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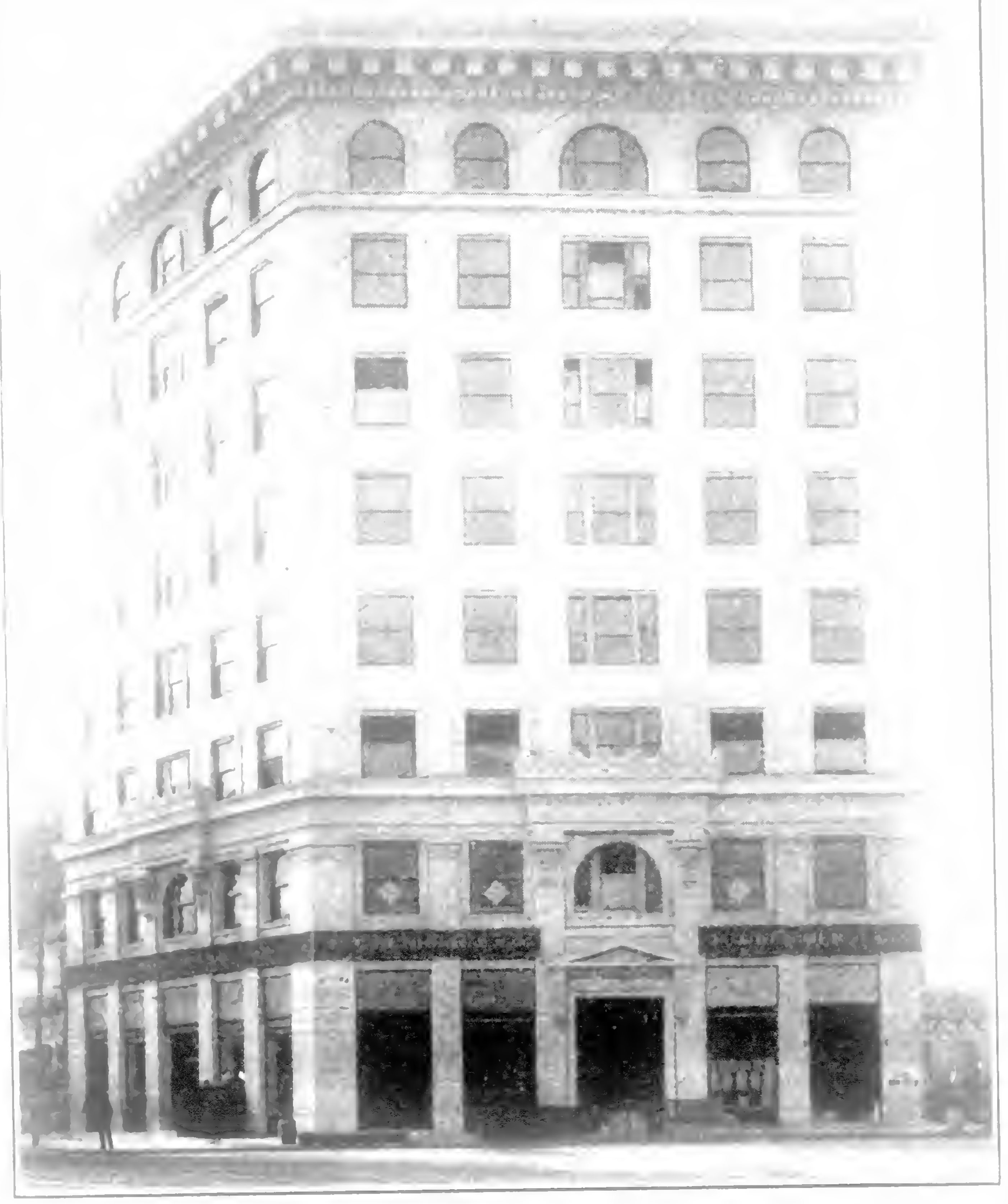

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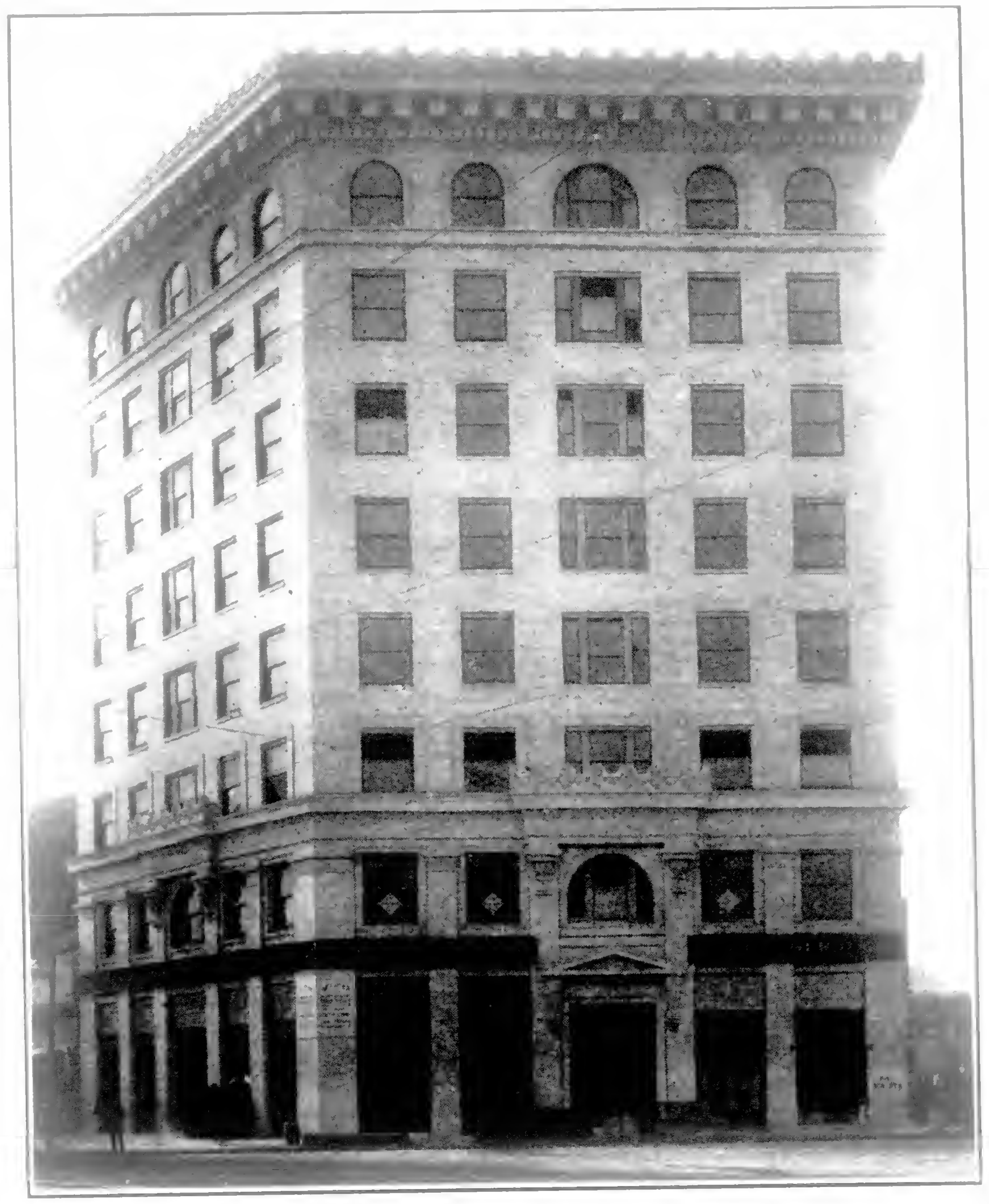

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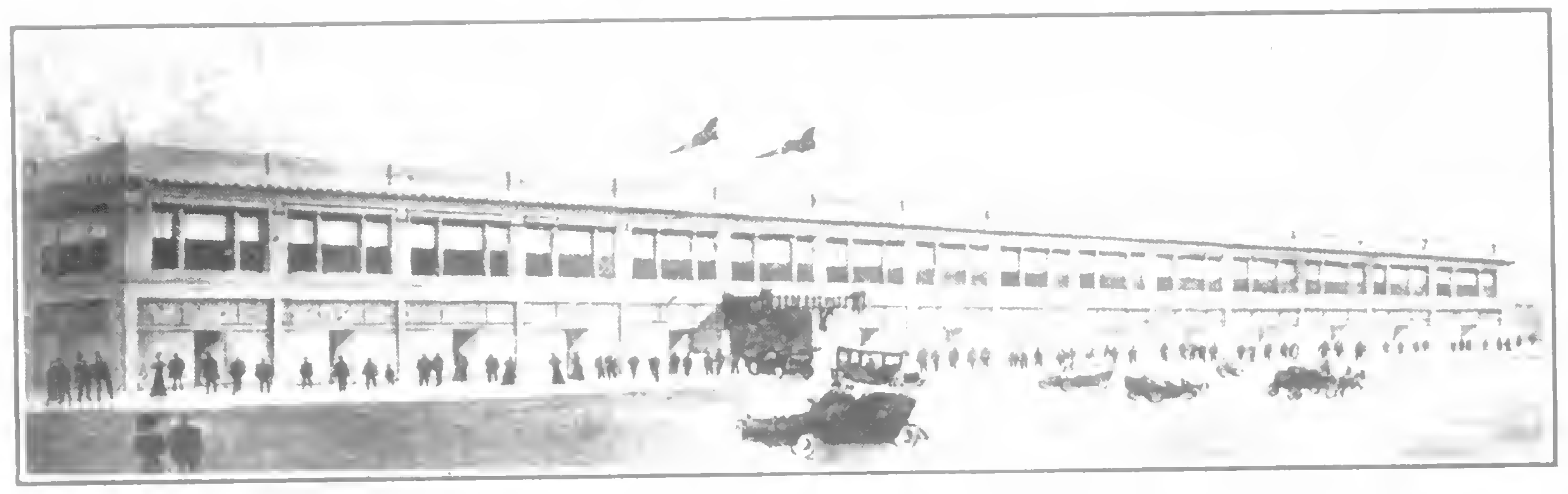

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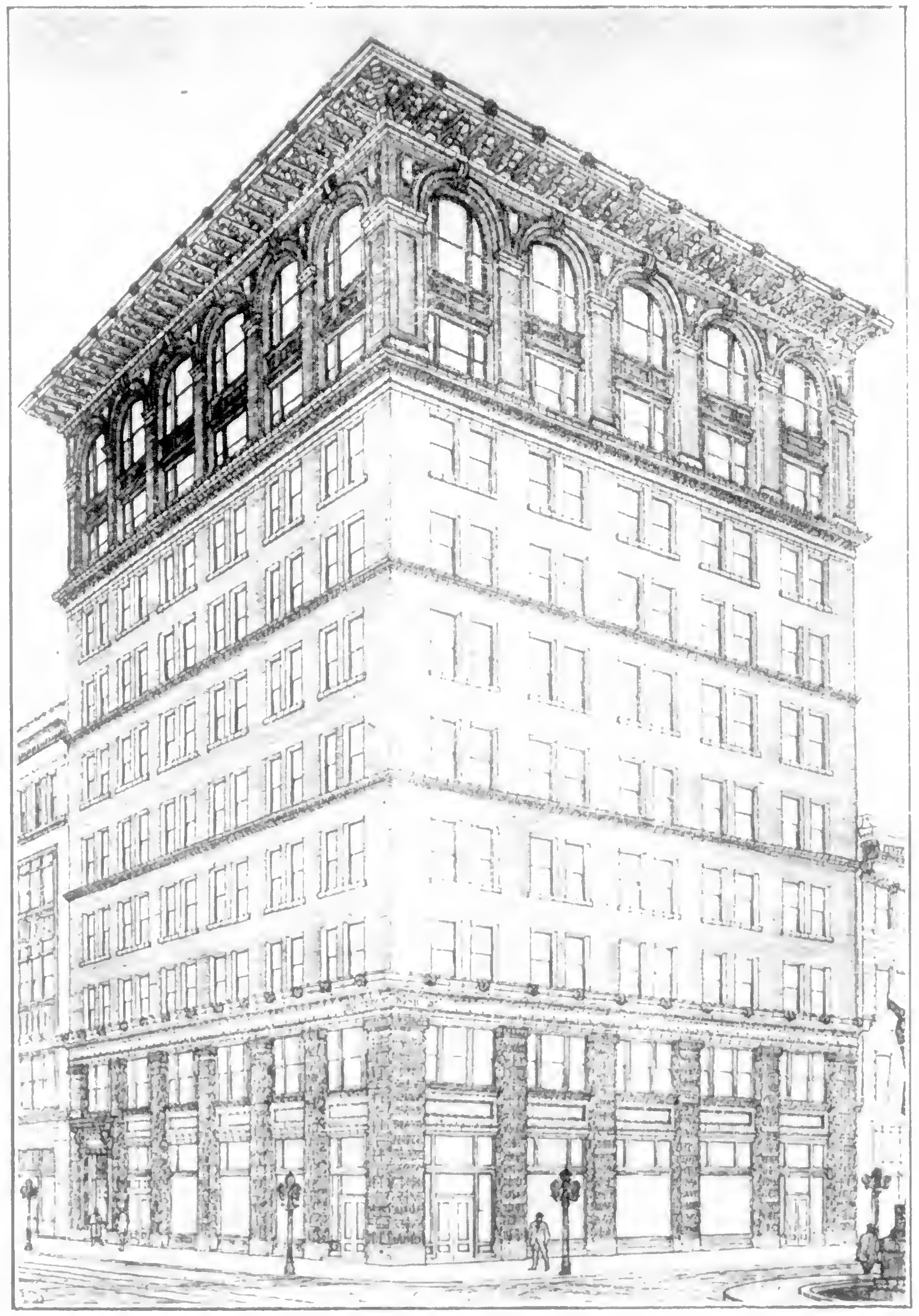

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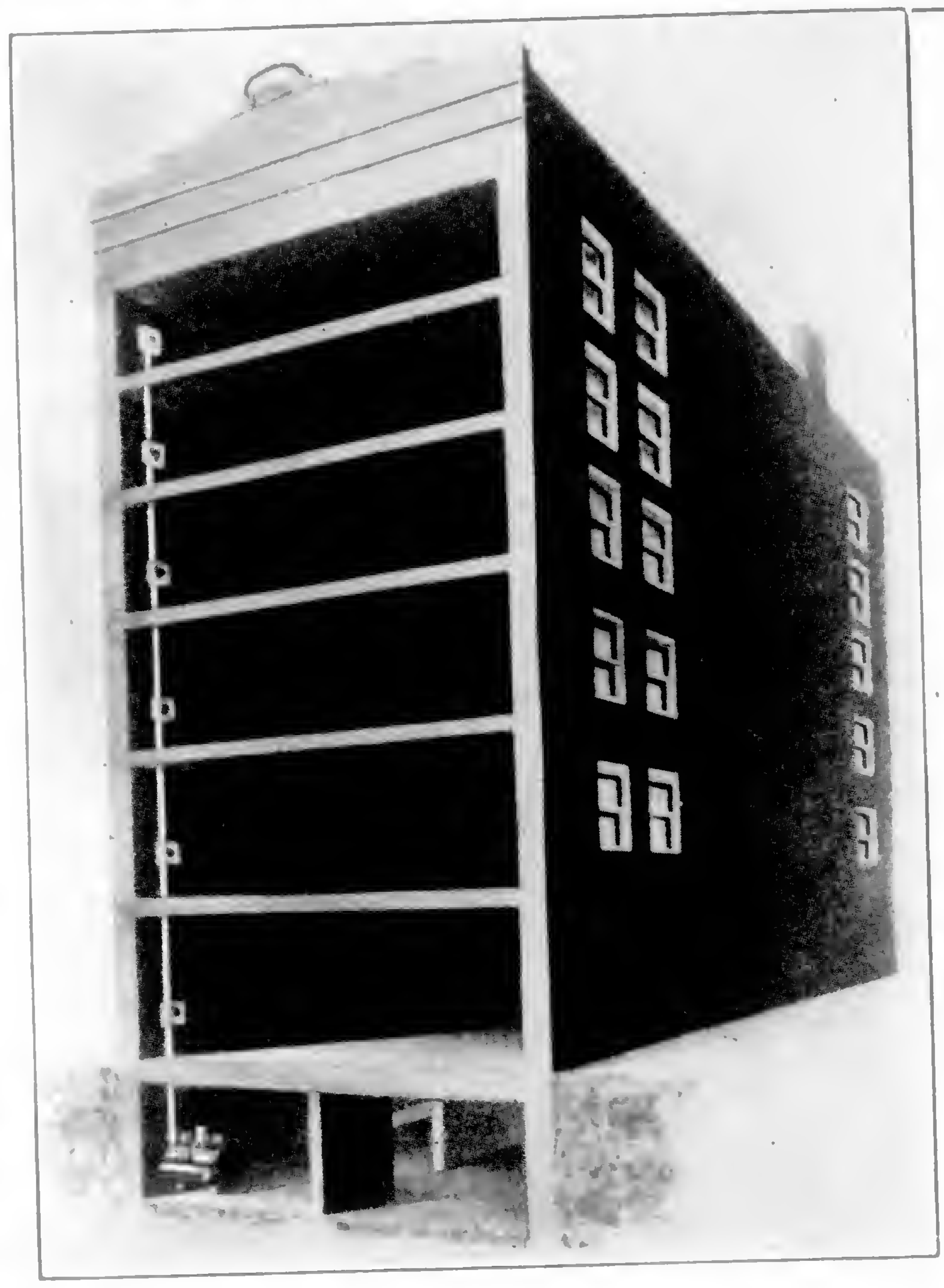

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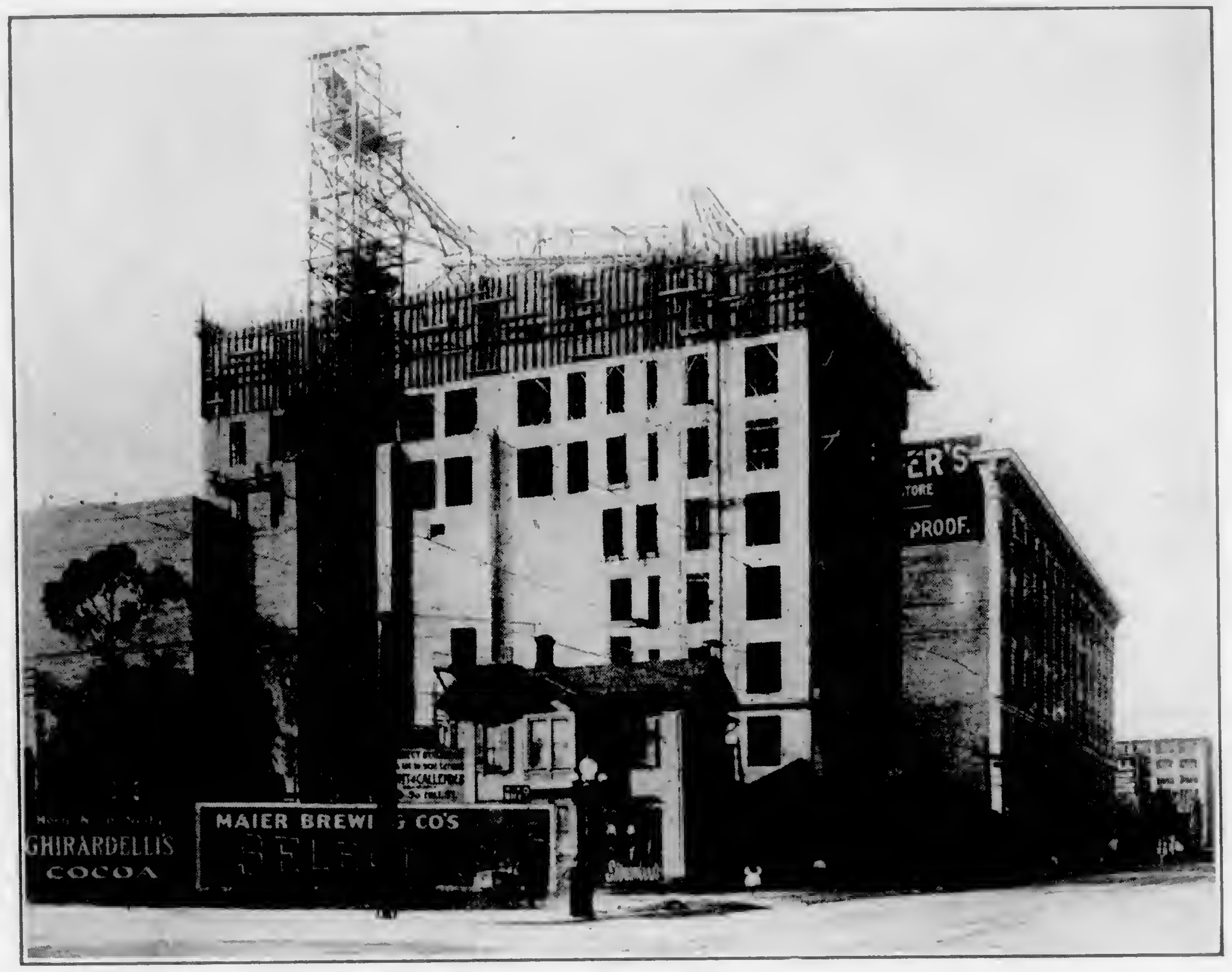

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(For Index to Advertisements, see page 97)

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- Otis Elevator Company, Stockton and North Point, S. F.
- Wells & Spencer Machine Co., 139 Beale St., S. F.
- Hammond Elevator Co., Seventh and King Sts., S. F.
- Pacific Electric Engineering Co., 213 Second St., Portland, Ore.

ENGINEERS
- W. W. Breite....925 Golden Gate Ave., S. F.
- Jno. B. Leonard......Sheldon Bldg., S. F.
- W. E. Leland..Merchants' Exc. Bldg., S. F.
- Thos. Morrin............Balboa Bldg., S. F.
- Cox & Vengelen......229 Pine St., Portland

FILTERS
- American Filter Co..16 California St., S. F.

FIRE ESCAPES
- Standard Iron Works.........Portland, Ore.
- Burnett Iron Works............Fresno, Cal.

FIRE EXTINGUISHERS
- Goodyear Rubber Company, 587-591 Market St., S. F.

FIREPROOFING
- Continental Fireproofing Co., 908 Mutual Bank Building, S. F.
- Western Expanded Metal Co., 426 Crocker Bldg., S. F.

FIREPROOFING—Continued.
- Roebling Const'n Co...Crocker Bldg., S. F.
- San Francisco Fireproofing Company, Collins system.......Metropolis Bank Bldg., S. F.
- Healy-Tibbitts Co.......Hansford Bldg., S. F.
- Nat'l Fireproofing Co.Monadnock Bldg., S. F. and Union Trust Bldg., L. A.

FIREPROOF FLOORING
- Raecolith Company.....71 First St., Portland 61 Yesler way, Seattle 207 Builders' Ex., S. F.
- Demolith Fireproof Flooring Company, 417 Montgomery St., S. F.

FIRE DOOR HANGERS
- California Fireproof Door Co., 1932 S. Main St., L. A.

FIREPROOF SHUTTERS AND DOORS
- Jas. G. Wilson Mfg. Co., 3 W. 29th St., New York, and
- McCormick-Henderson Co., 110 Bush St., S. F.

FIRE PROTECTION
- Goodyear Rubber Company, 587-591 Market St., S. F.

FIREPROOF SHUTTERS
- Larsen & Reed, 1325 Mission St., S. F.

FLOORING—ENGLISH BLOCK FLOOR
- Jas. G. Wilson Mfg. Co., 3 W. 29th St., New York, and
- McCormick-Henderson Co., 110 Bush St., S. F.

FLOOR POLISH
- Butcher's Boston Polish Co., 356 Atlantic Ave., Boston, Mass.

GAS FURNACES
- Gas Furnace Co. ....226 Oak St., S. F.
- Gas and Electric Appliance Co., 914 O'Farrell St., S. F.

GENERAL CONTRACTORS, ENGINEERS, ETC.
- Wm. B. Abbitt Construction Co., 370 Monadnock Bldg., S. F.
- Continental Fireproofing Co., Mutual Savings Bank Bldg., S. F.
- Richard Keatinge & Sons, Williams Bldg., Third and Mission Sts., S. F.
- Laughland & Schnebly Co., 1443 Broadway, Oakland
- Lange & Bergstrom, 138 Investors' Bldg., S. F.
- Globe Const'n Co.......Chronicle Bldg., S. F.
- Ransome Concrete Co....Crocker Bldg., S. F.
- Hoyt Bros., Builders' Exchange, S. F., and Santa Rosa
- Healy-Tibbitts Construction Co., 106-11 Hansford Block, S. F.
- Litherland & Abrey.229 Beck Bldg., Portland
- W. McKenzie ....734 Washington St., S. F.
- Von der Horst Bros., Macdonough Bldg., S. F.
- Peter Randolph Co., 622 Chronicle Bldg., S. F.

ARCHITECTS' SPECIFICATION INDEX—*Continued*

GENERAL CONTRACTORS—Continued.
Redmond, De Luca & Barzellotti, 628 Montgomery St., S. F.
C. P. Moore Building Co., 703 Mills Bldg., S. F.
Smith & Watson Co.....323 Lick Bldg., S. F.
Hansbrough & Yorston, 716 Metropolitan Bank Bldg., S. F.
Gutleben Bros..944 Monadnock Bldg., S. F.
Stewart & Ratliff, 2407 Santa Clara Ave., Alameda, Cal.
Keystone Construction Co., 417 Montgomery St., S. F.
Corwin & Dare..........Lick Bldg., S. F.
Webster-Mace Construction Co., Merchants' Exchange Bldg., S. F.

GENERAL INSPECTION
Western Inspection Bureau, 621 Monadnock Bldg., S. F.

GLASS—PRISM, ART, ETC.
Cal. Art Glass Works..938 Howard St., S. F.
San Francisco Art Glass Works, 944 Mission St., S. F.
United Glass Co.........115 Turk St., S. F.
Munich Art Glass Co.....510 Turk St., S. F.
Povey Bros. Glass Co., Fifth and Flanders Sts., Portland

GRAVEL AND CRUSHED ROCK
John Cassaretto......245 Berry St., S. F.
Kruttschnitt Building Material Co., Monadnock Bldg., S. F.

HARDWOOD LUMBER
E. A. Howard Co.......20 Howard St., S. F.
King-Brown Co., First St., bet. Wash'n & Clay, Oakland
White Brothers, Cor. Spear and Howard Sts., S. F.
Dieckman Hardwood Co..Welch Bldg., S. F.

HARD WALL PLASTER
Chubbuck & Harris....710 Mission St., S. F.
Empire Plaster Co., 16th and Harrison Sts., S. F.
Marbleite Hardwall Plaster, sold by Western Building Material Co., 340 Steuart St., S. F.
Adamant Company, Worcester Bldg., Portland

HEATING AND VENTILATING
Burness & Martin.129 Sixteenth St., Portland
A. W. Curry.......116 Grand Ave., Portland
T. C. Thronson, 415 Hawthorne Ave., Portland
Thos. E. Hulme & Co., 275 Fifth St., Portland
C. L. Johnson & Co., 285 Grand Ave., Portland
Gardner & Kendall Heating Co., 40-42 Second St., Portland, Ore.
Jordan Flue Block Co........Ashland, Ore.
Machinery and Electrical Co., 351-353 N. Main St., Los Angeles
Solar Heater Co., 333 New High St., Los Angeles
Mangrum & Otter, Inc..507 Mission St., S. F.
Pacific Blower & Heater Co., 3261 17th St., S. F.
Gilley-Schmid Co., Inc., 13th and Mission Sts., S. F.
United Builders' Supply Co., 687 Mission St., S. F.

HEATING ENGINEERS
Cox & Vengelen..229 Pine St., Portland, Ore.
W. E. Leland....Merchants Ex. Bldg., S. F.

IMITATION STONE
O. Barbi..........612 Washington St., S. F.
Ideal Concrete Construction Co., 102 Grand ave., Portland, Or.

INSURANCE
Pacific Surety Co..326 Montgomery St., S. F.
Voss, Conrad & Co...Monadnock Bldg., S. F.
Standard Marine Ins. Co., Montgomery and Sacramento Sts., S. F.

INTERIOR DECORATING
J. Llewellyn...........412 Kearny St., S. F. and 1325 Telegraph Ave., Oakland
Schastey & Vollmer, 1930 Van Ness Ave., S. F.
W. W. Tucker, 14th and Webster Sts., Oakland
C. E. Gordon..........1235 Pierce St., S. F.

JOIST HANGERS
Western Builders' Supply Co., 680 Mission St., S. F.

LAUNCHES AND TUG BOATS
Crowley Launch & Tug Boat Co., Howard St. Wharf, S. F.

LAUNDRY MACHINERY
Western Laundry Machinery Co., 58-60 Fremont St., S. F.

LAUNDRY TRAYS
J. F. Reilly & Co.....23 Spencer Place, S. F.
Peerless Mfg. Co.....364 Eleventh St., S. F.

LIGHTING FIXTURES
Barrett's Lighting Fixtures, 408 Morrison St., Portland Ore.
The Enos Company..1748 California St., S. F
Adams & Hollopeter....745 Mission St., S. F.
Welsbach Co.......351 McAllister St., S. F.
Morrison Electric Co., 291 Morrison St., Portland

LIME
Holmes Lime Co.....Mutual Bank Bldg., S. F.
Union Lime Company, 209 San Pedro St., L. A.

LUMBER
Pope & Talbot ......Foot of Third St., S. F.
Redwood Manufacturers Co., 453 Bryant St., S. F. 57th St., Oakland
E. K. Wood Lumber Company, Santa Marina Bldg., 112 Market St., S. F.
Oregon Planing Mills, Nineteenth and Vaughn Sts., Portland, Or.
S. H. Harmon Lumber Company, Fifth and Bryant Sts., S. F.

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Eby Machinery Co.....Hansford Bldg., S. F.
Kelsey & McEvoy....313 Howard St., S. F.
Steiger & Kerr Stove & Foundry Co., Folsom and 18th Sts., S. F.

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California Marble & Construction Co., 251 Kearny St., S. F.
Italian & American Marble Works, 16th and Carolina Sts., S. F.
Calif. Peerless Stone and Tile Co., 109 O'Farrell St., S. F.
Baxter Marble Co...........Call Bldg., S. F.
American Marble & Mosaic Co 124 Harriet St., S. F.
Columbia Marble Co., 268 Market St., S. F.
Pacific Marble Works, 14th and Shotwell Sts., S. F.

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Goodyear Rubber Company, 587-591 Market St., S. F.

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Fogle & Mauer Co., representing Canton Art Metal Co...532 Monadnock Bldg., S. F.

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"All United Steel Studding," Lilley & Thurston Co...82 Second St., S. F.

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W. Heidt Cornice Works..152 First St., S. F.
Portland Sheet Metal Works, E. 7th and E. Madison Sts., Portland, Ore.

METAL WEATHER STRIPS
Williams & Carter Co...197 Jessie St., S. F.

METAL WINDOWS
Portland Sheet Metal Works, Portland, Ore.

ARCHITECTS' SPECIFICATION INDEX—*Continued*

MOTORS, GENERATORS, ETC.
Engineering & Maintenance Co., 195 Fremont St., S. F.
San Francisco Engineering Co., 322 Sixth St., S. F.
Western Electric Works, 61 Sixth St., Portland

MORTAR STAINS
Western Builders' Supply Co., Representing Clinton Metallic Paint Co., Clinton, N. Y.

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McCormick & Henderson..110 Bush St., S. F.

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S. T. Johnson Co......1334 Mission St., S. F.
G. E. Witt Co.......1165 Howard St., S. F.
Bennett's Petroleum Burner Co., 579 Howard St., S. F.
William Ernst..........203 Main St., S. F.
California Oil Burner Co., 717 Market St., S. F.

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Associated Oil Co...Wells, Fargo Bldg., S. F.

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Spencer Desk Co....Monadnock Bldg., S. F.
Whitaker & Ray Co....141 Grove St., S. F.

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Thos. Landy..........1673 Market St., S. F.
Western Builders' Supply Co., 680 Mission St., S. F.

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Sing Chong Co., 601 Dupont St., cor. California, S. F.

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Chr. Deterding......67 Clementina St., S. F.
Louis De Rome ....128 Main St., S. F.
Winslow Bros. ......Monadnock Bldg, S. F. Security Bldg., L. A.
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Paraffine Paint Co., Merchants Exchange Bldg., S. F.
Oregon Paint & Varnish Co., 93 Grand Ave., Portland, Ore.

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A. J. Houch & Son, 431 E. Harrison st., Portland, Ore.
D. Ross Clark....708 Pacific Building, S. F.
Walsh & McCrovy..154 Clinton Park, S. F.

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Fox & Co.......209 Second St., Portland
M. L. Kline... ....84 Front St., Portland
Taylor & Stanton......308 Pine St., Portland
Thos. E. Hulme......275 Fifth St., Portland
The Gauld Co...9 North Front St., Portland
J. F. Shea.Second and Ankeny Sts., Portland
Ryan Bros., 540 Williams ave., Portland, Ore.

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Corvallis & Eastern Ry........Portland, Ore.

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Asbestos Roofing, H. W. Johns-Manville Co...................180 Second St., S. F.
Mackenzie Roof Co., 427 Fifteenth St., Oakland
Pacific Coast Paper Co..307 Market St., S. F.
The Watson Roof Co., French Bank Bldg., 110 Sutter St., S. F.

ROOFING AND ROOFING MATERIALS—Continued.
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W. H. Wilson........42-44 Natoma St., S. F.
Paraffine Paint Co., Merchants' Exchange Bldg., S. F.

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McCormick-Henderson Co., 110 Bush St., S. F.

RUBBER STAMPS, ETC.
Patrick & Co............126 Bush St., S. F.

RUBBER TILING
Goodyear Rubber Co., 587 Market St., S. F. 61 Fourth St., Portland

SAFES
Parcells Safe Company, 577 Market St., S. F.
Herring-Hall-Marvin Safe Co., 36 Second St., S. F.

SAFETY TREAD
Murphey & Orton......268 Market St., S. F.

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Marysville Sand and Cement Block Co., Marysville, Cal.
L. E. Chattock,......1087 Natoma St., S. F.

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"Magnolith," Portland Sanitary Floor Co., 185 Jefferson St., Portland
"Raecolith," Pacific Builders Supply Co., Builders' Ex., S. F., and Raecolith Co., 71 First St., Portland

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SHEET METAL WORK
W. Heidt Cornice Works..152 First St., S. F.
Feldman & Sommer, 134-136 Fourteenth St., S. F.

SIDEWALK LIGHTS
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- Howe Scale Co..........143 Main St., S. F.

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- Callahan & Manetta....344 Tenth St., S. F.
- Thos. Landy, Junction of Valencia and Market Sts., S. F.

STAMPED SHEET METAL ORNAMENTS
- San Francisco Metal Stamping & Corrugating Co., 296 Eleventh St., S. F.

STANDARD SCALES
- George A. Riggs, rep. The Howe Scale Co..................143-149 Main St., S. F.

STEAM POWER PLANTS
- The Tracy Engineering Company, 823 Sheldon Bldg., S. F. 700 Central Bank Bldg., Los Angeles

STEEL BARS FOR CONCRETE REINFORCEMENT
- Woods & Huddart....356 Market St., S. F.
- Tayler & Spotswood Co., Minnesota and 19th Sts., S. F.
- Jno. B. Leonard, C. E..Sheldon Bldg., S. F.

STEEL ERECTING
- C. A. Blume ......185 Stevenson St., S. F.
- Wm. B. Abbitt Construction Co., 370 Monadnock Bldg., S. F.

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- Chas. M. Finch............Boyd Bldg., S. F.
- Williams & Carter Co.....197 Jessie St., S. F.

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- J. G. Braun, 537 W. 35th St., N. Y., and 322 S. Paulina St., Chicago

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- Lilley & Thurston.......82 Second St., S. F.
- Bostwick Steel Lath Co...........Niles, Ohio

STREET PAVING
- Worswick Street Paving Co., Union National Bank, Fresno

STRUCTURAL STEEL AND IRON
- Brode & Clark Iron Works, 621 Howard St., S. F.
- Burnett Iron Works.............Fresno, Cal.
- City Iron Works....303 Front St., Portland
- Dyer Bros......17th and Kansas Sts., S. F.
- Metropolitan Iron Works..Balboa Bldg., S. F.
- Woods & Huddart......356 Market St., S. F.
- Pacific Iron Works...........Portland, Ore.
- Northwest Bridge Works......Portland, Ore.
- Pacific Rolling Mills, 17th and Mississippi Sts., S. F.
- Western Iron Works......125 Beale St., S. F.
- Joshua Hendy Iron Works, 75 Fremont St., S. F.
- Tayler & Spotswood Co., Minnesota and 19th Sts., S. F.

TANKS
- Pacific Tank Company..318 Market St., S. F.

TILE CONTRACTORS
- Kirwan & Donovan......159 Fifth St., S. F.

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- Mangrum & Otter....561 Mission St., S. F.
- Carquinez Brick & Tile Co., 257 Russ Building, S. F
- Oregon Art Tile Co., 311 Stark St., Portland
- W. W. Montague..Polk St., near Eddy, S. F.

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- The Bostwick Steel Lath Co., represented by McCormick & Henderson, 110 Bush St., S. F., and A. J. Capron, Ainsworth Bldg, Portland.

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VALVE PACKING
- "Palmetto Twist," sold by H. N. Cook Belting Co..........317 Howard St., S. F.

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VENEERS
- Dickmann Hardwood Co., Welch Bldg., 244 California St., S. F.

WARDROBES—HYGIENIC
- Jas. G. Wilson Mfg. Co., 3 W. 29th St., New York, and McCormick-Henderson Co., 110 Bush St., S. F.

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- Gas and Electric Appliance Co., 914 O'Farrell St., S. F.
- Pittsburg Heaters, represented by Jos. Thieben & Co., 585 Mission St., S. F.
- Humphrey Co., 565 N. Rose St., Kalamazoo, Mich.

WATERPROOFING FOR CONCRETE, ETC.
- The Building Material Co., Inc., 587 Monadnock Bldg., S. F.
- "Hydrex Felt," sold by L. E. Boyle Co., Inc..................100 Front St., S. F.

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- Dean Reversible Window Co., 551 Brannan St., S. F.
- Hipolito Screen & Sash Co., 634 Maple Ave., Los Angeles

WIRE LATH AND ROPE
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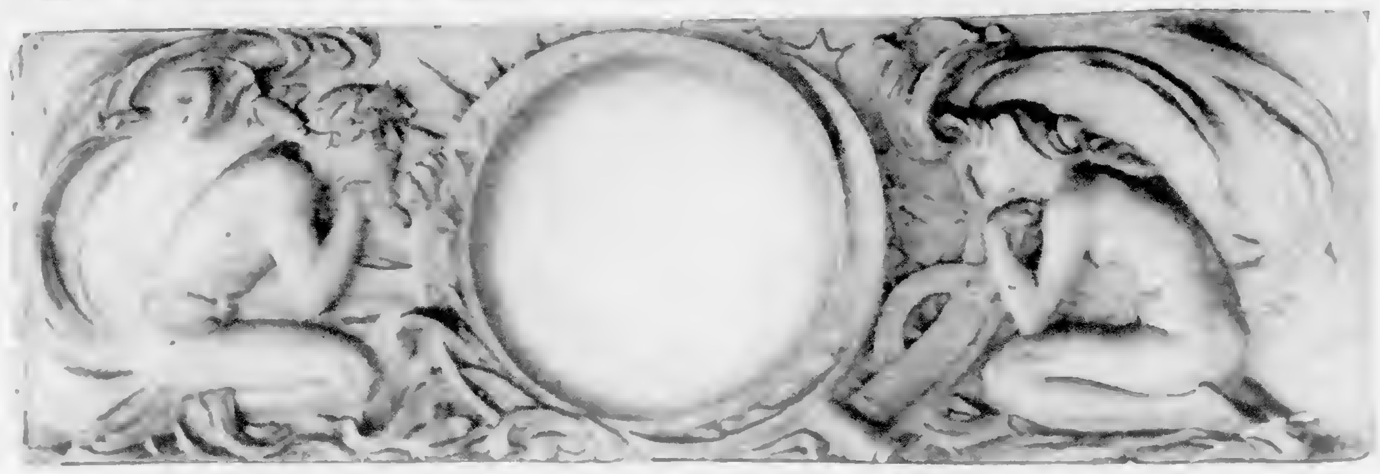

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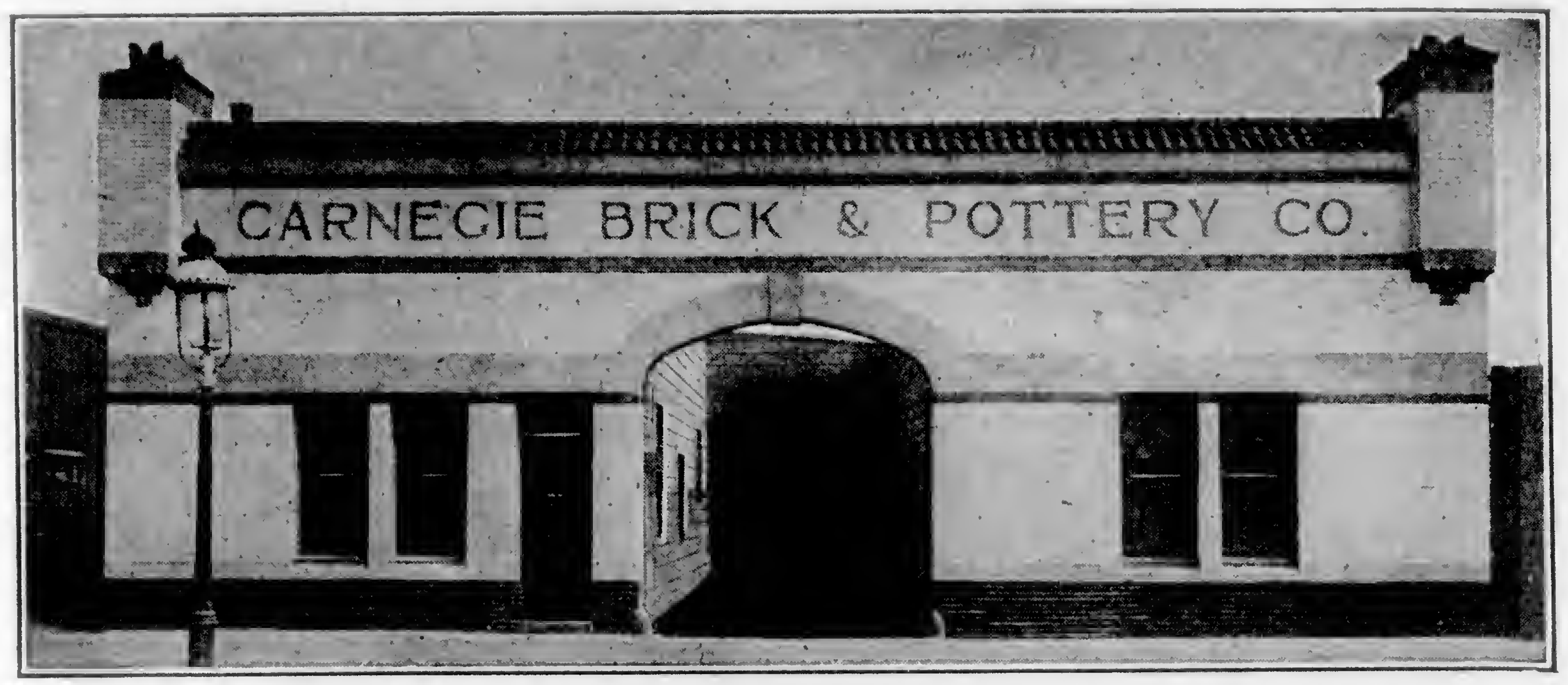

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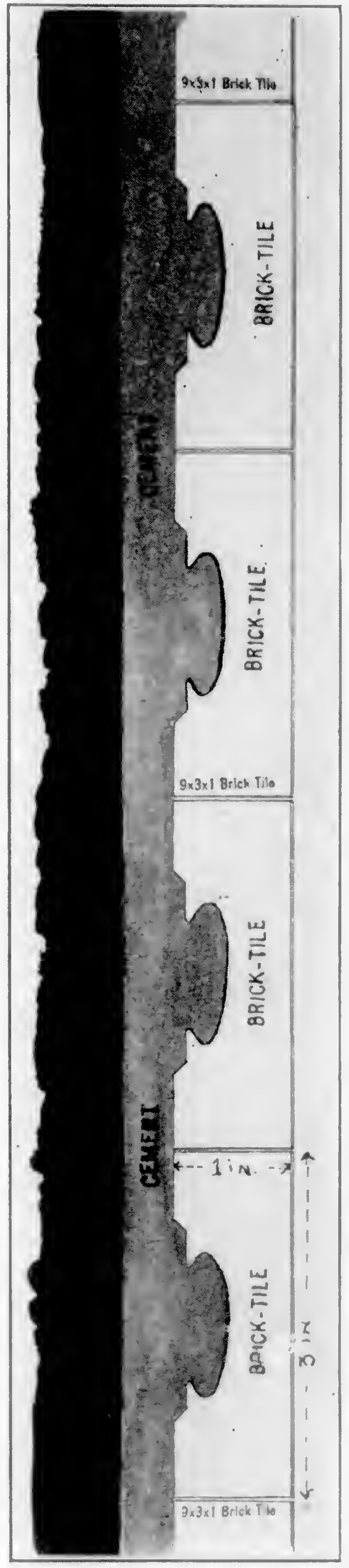
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BRICK-TILE
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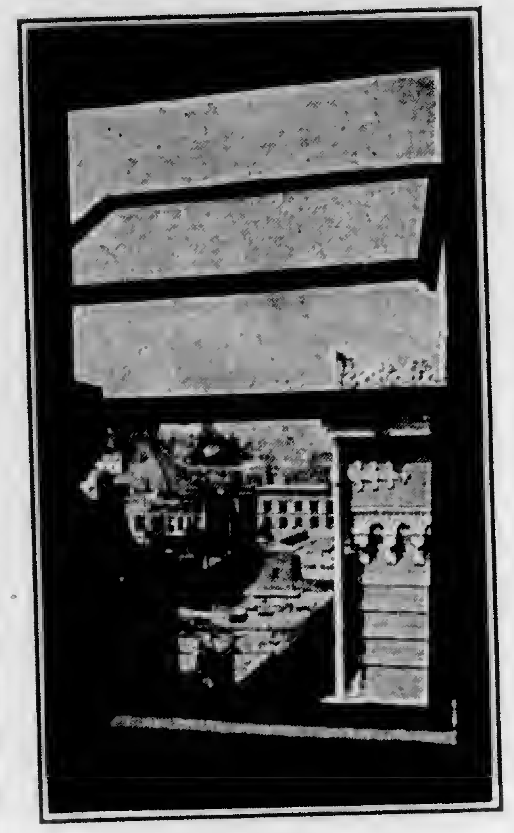

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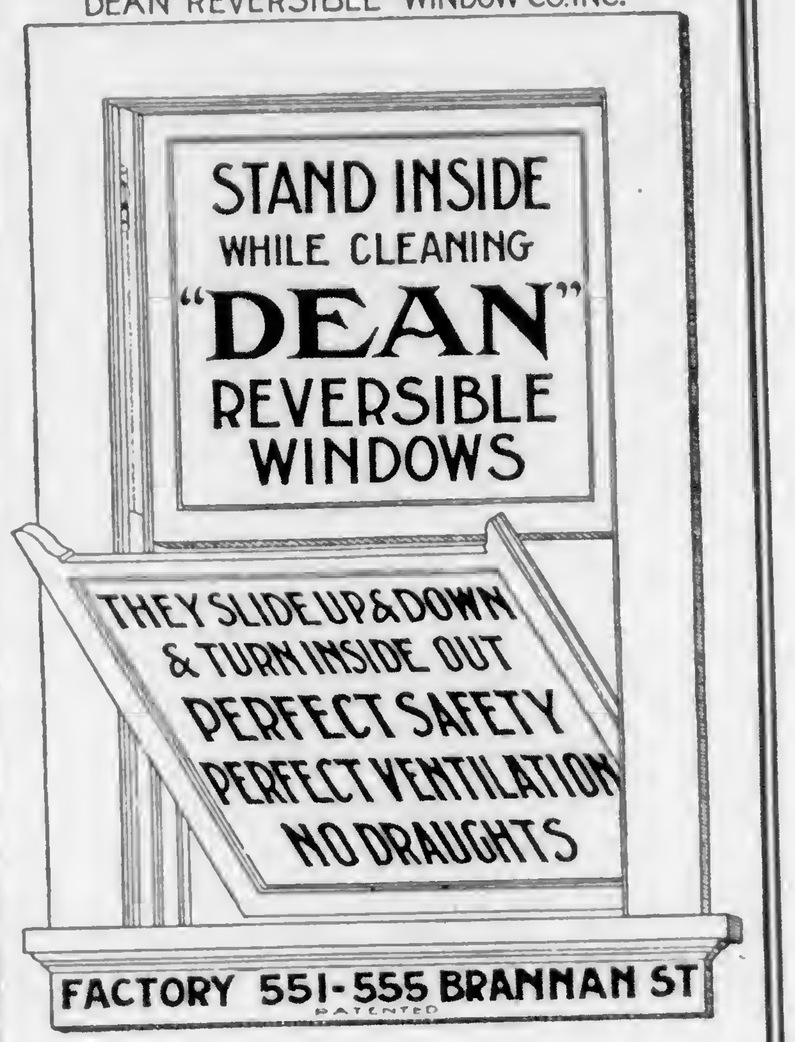
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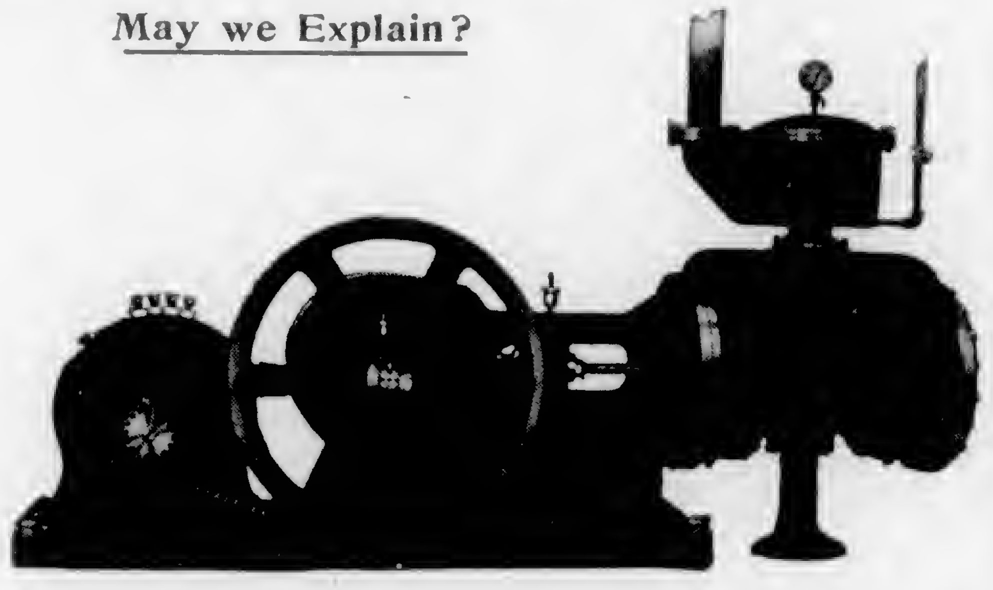

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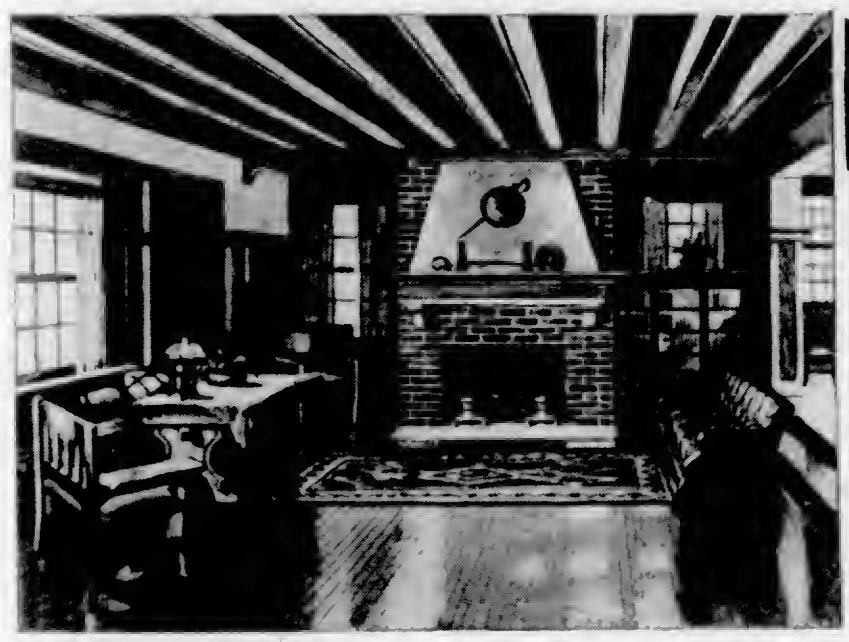

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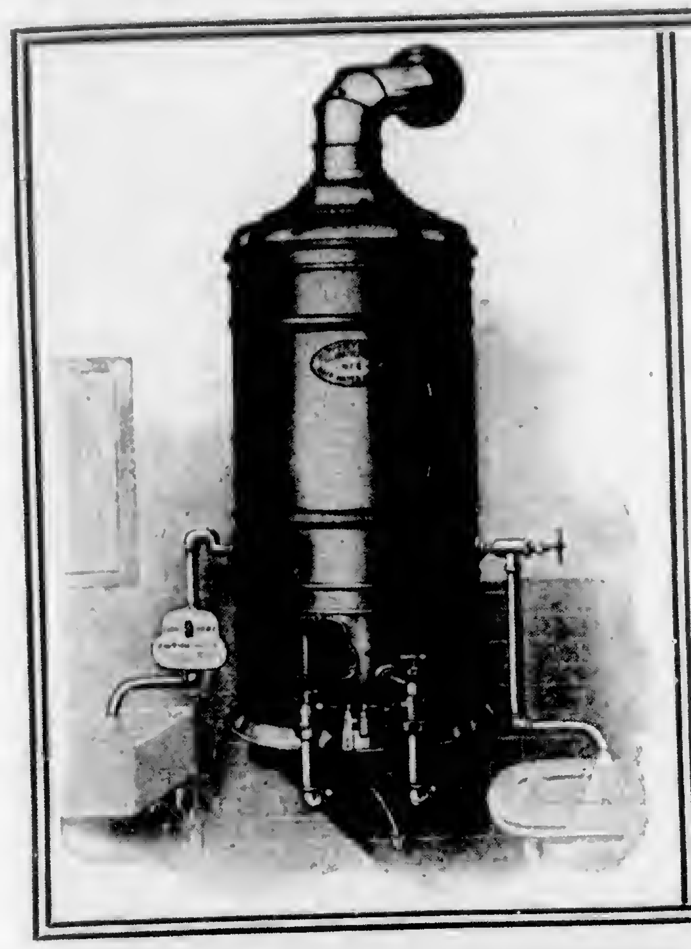

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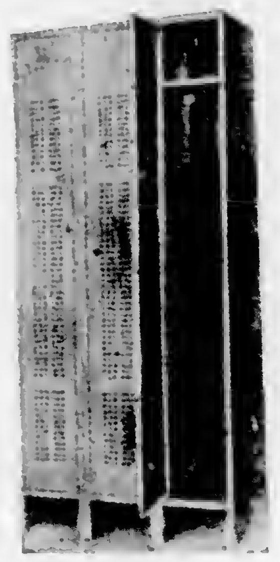

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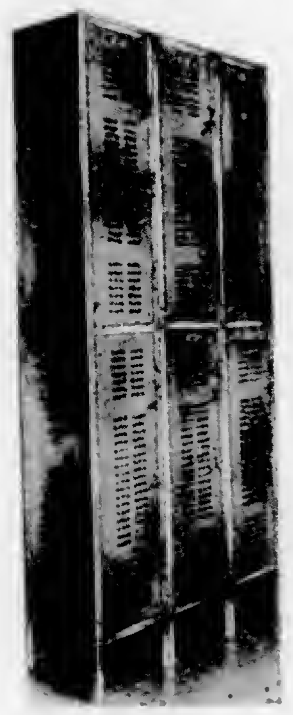

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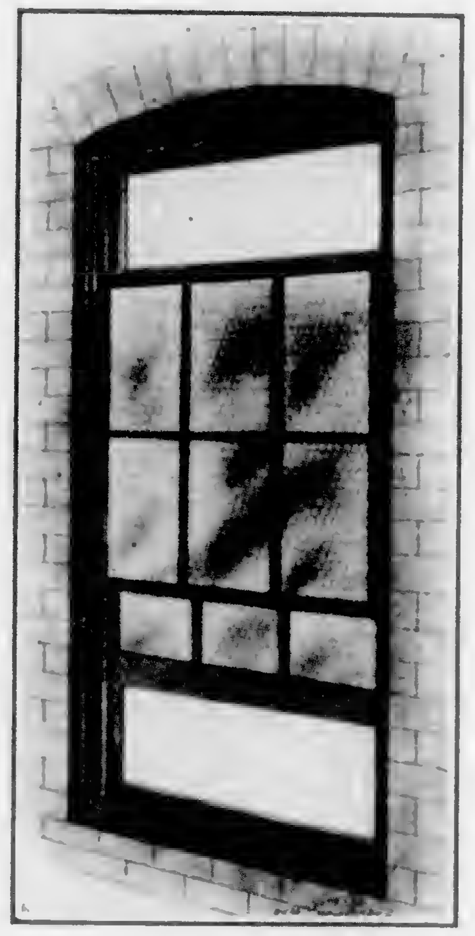

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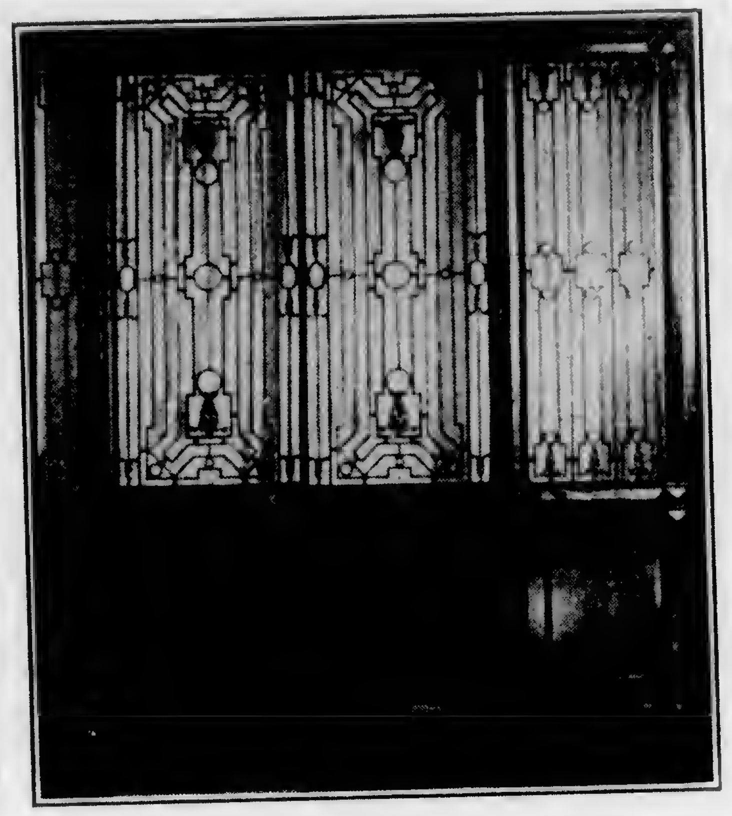

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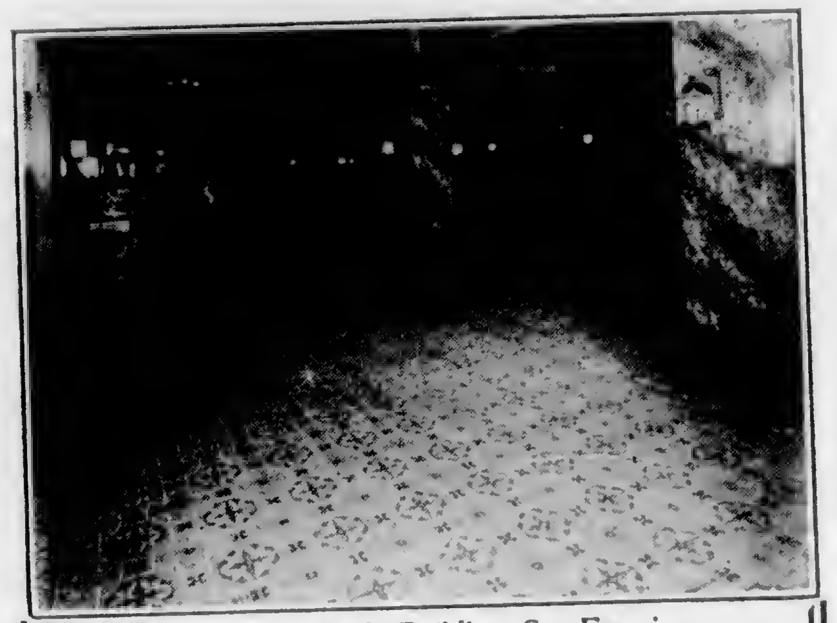

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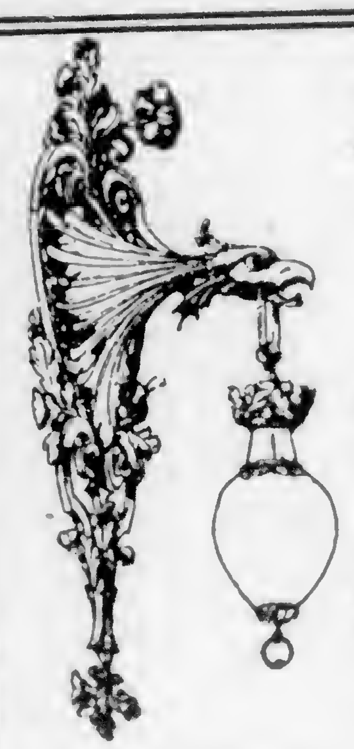

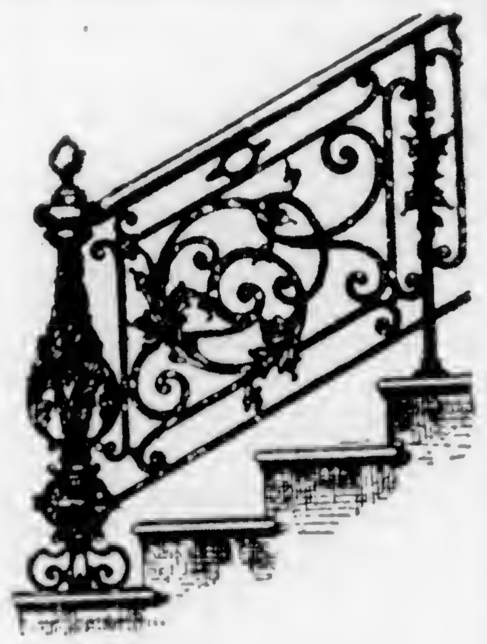

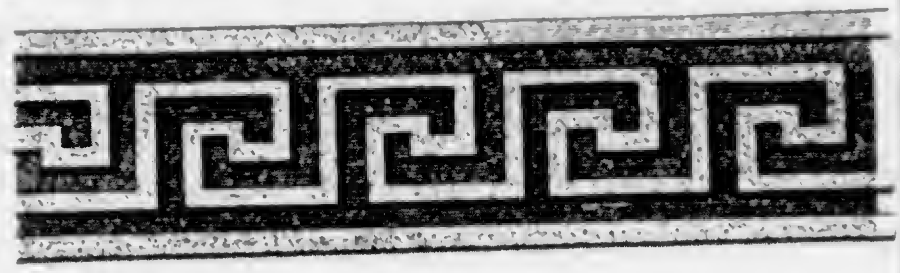

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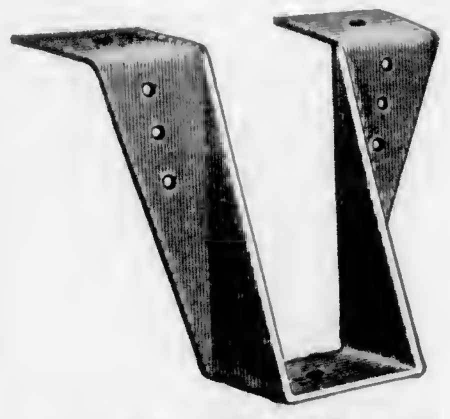

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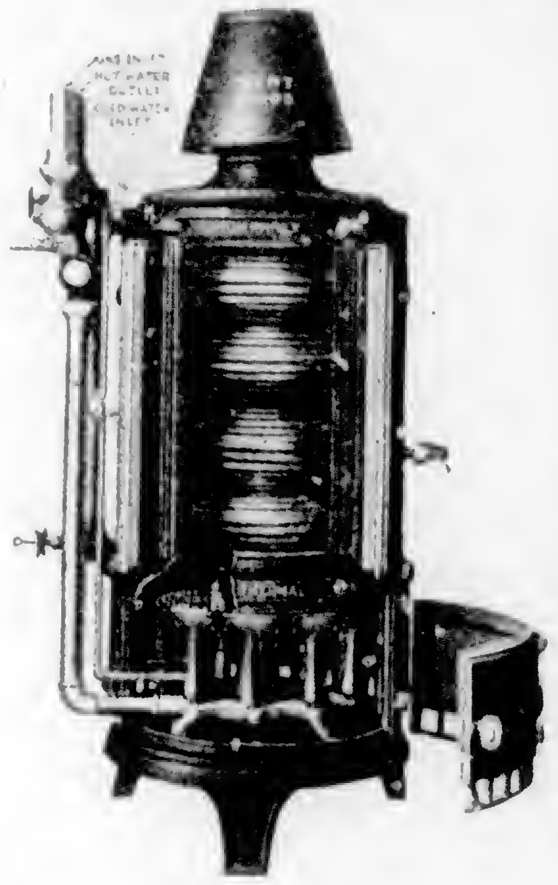

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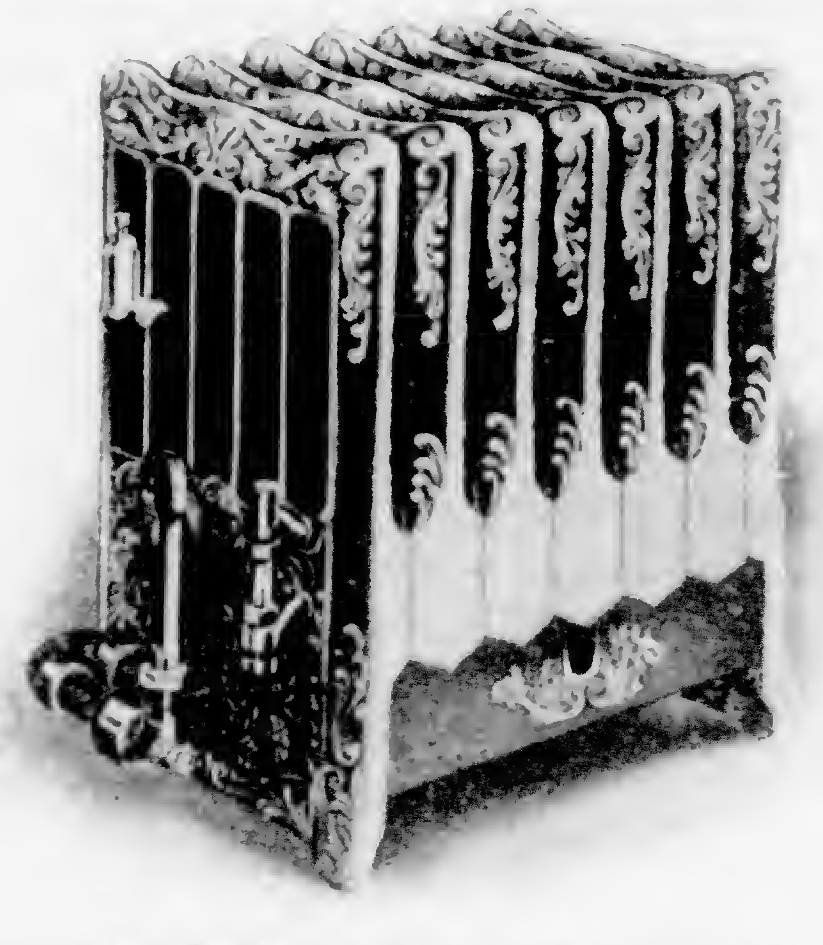

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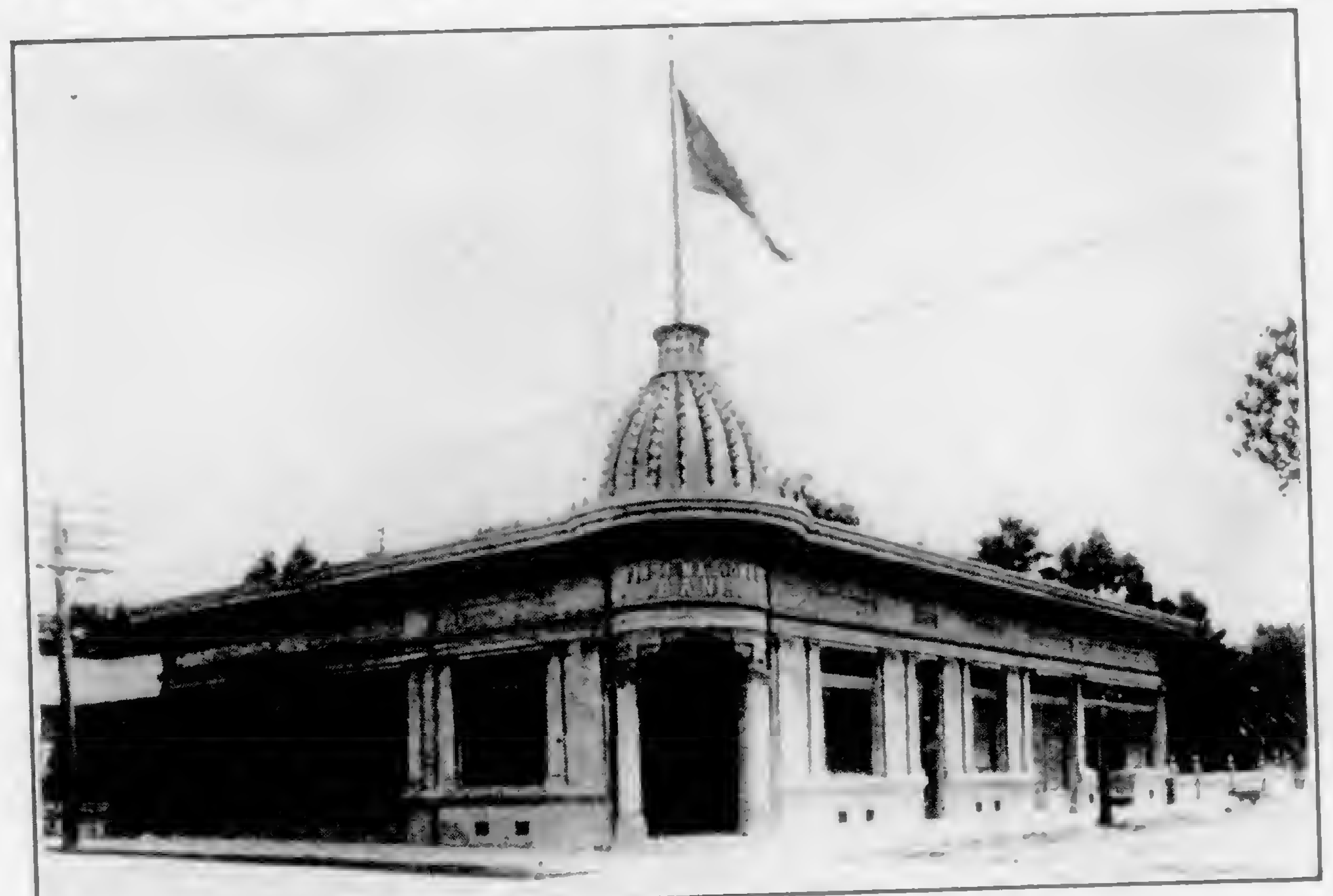

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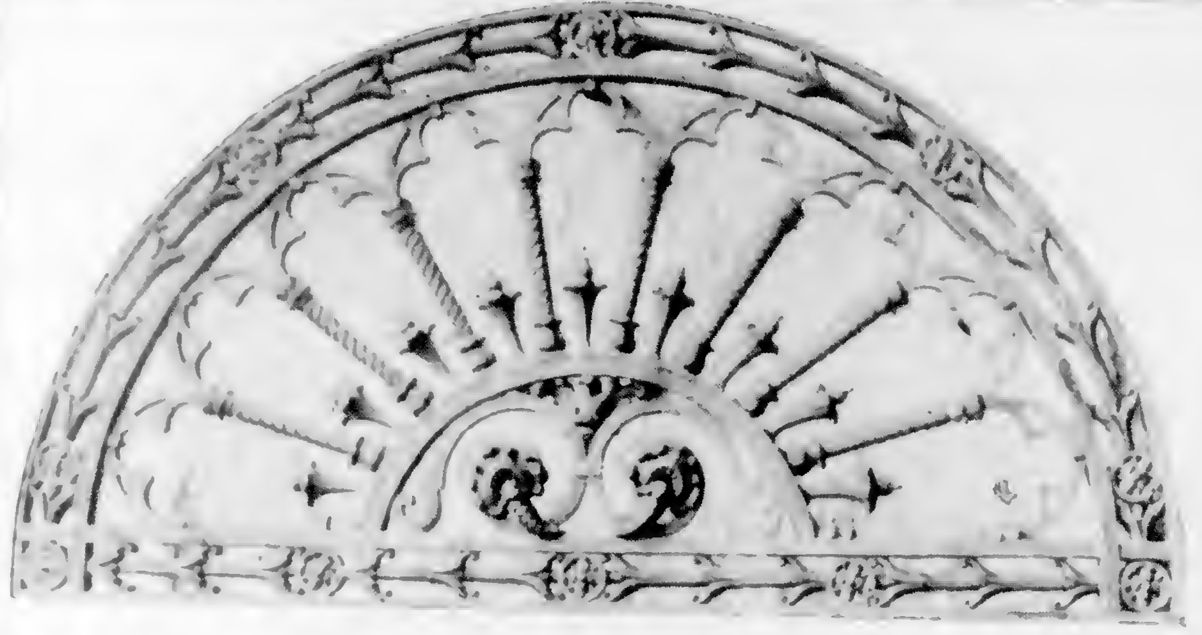

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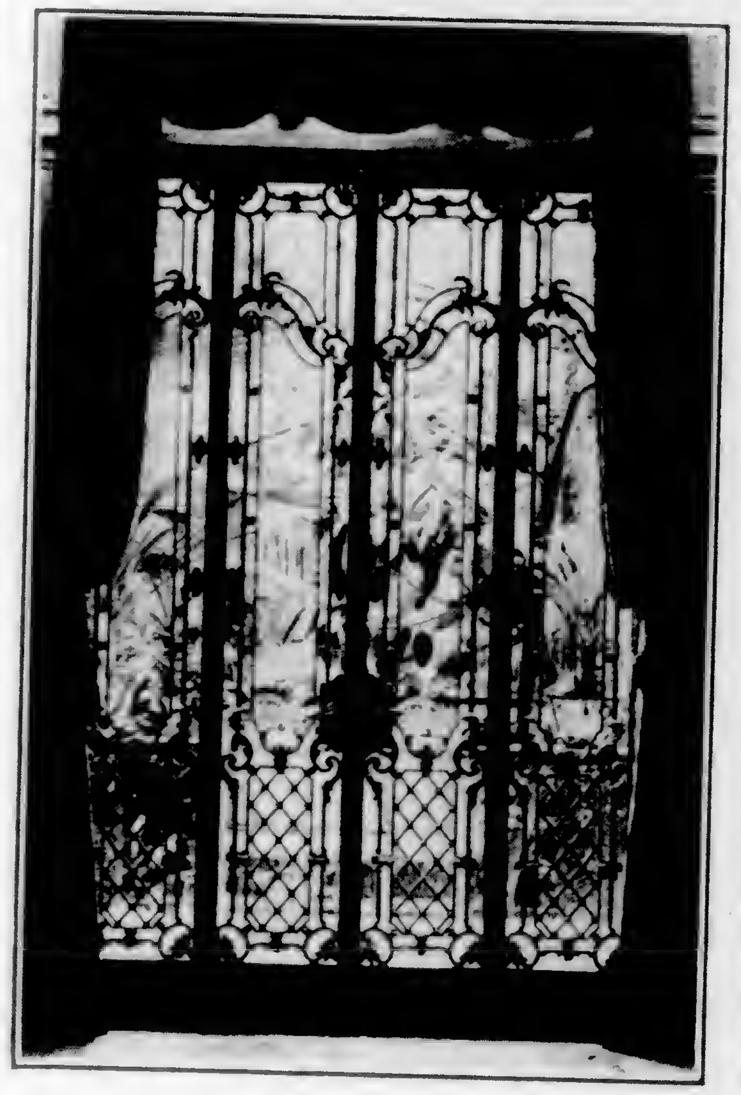

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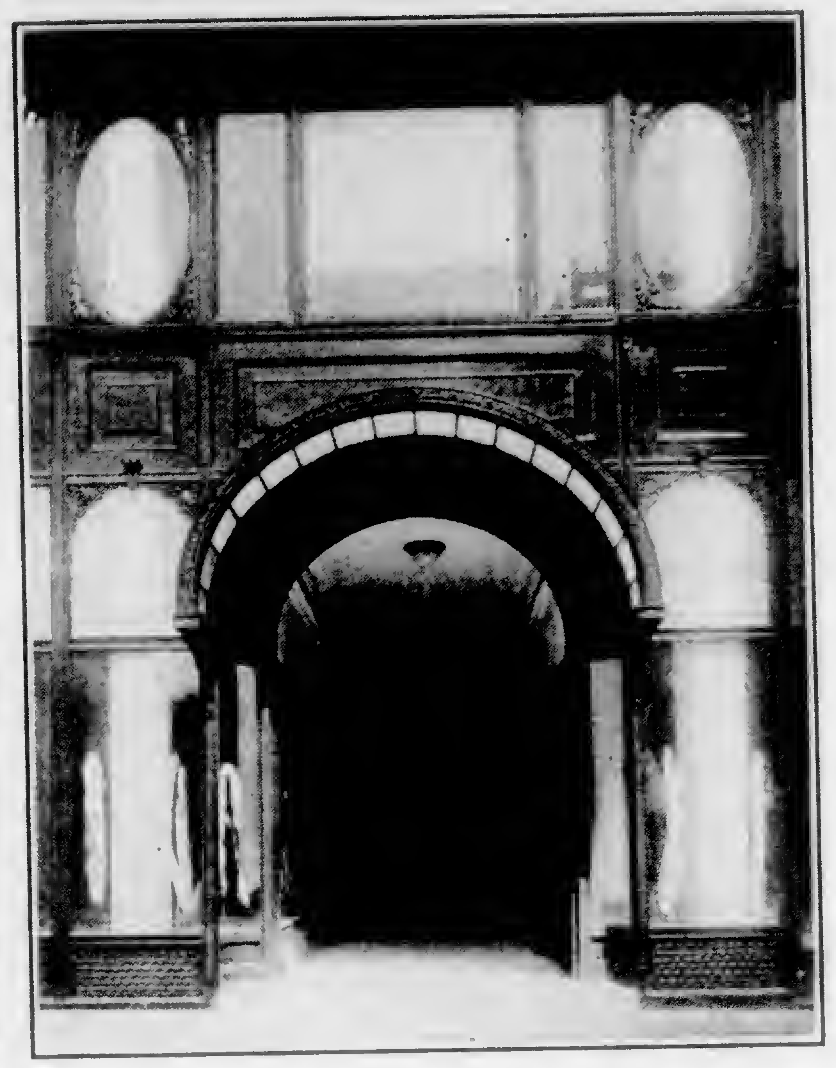

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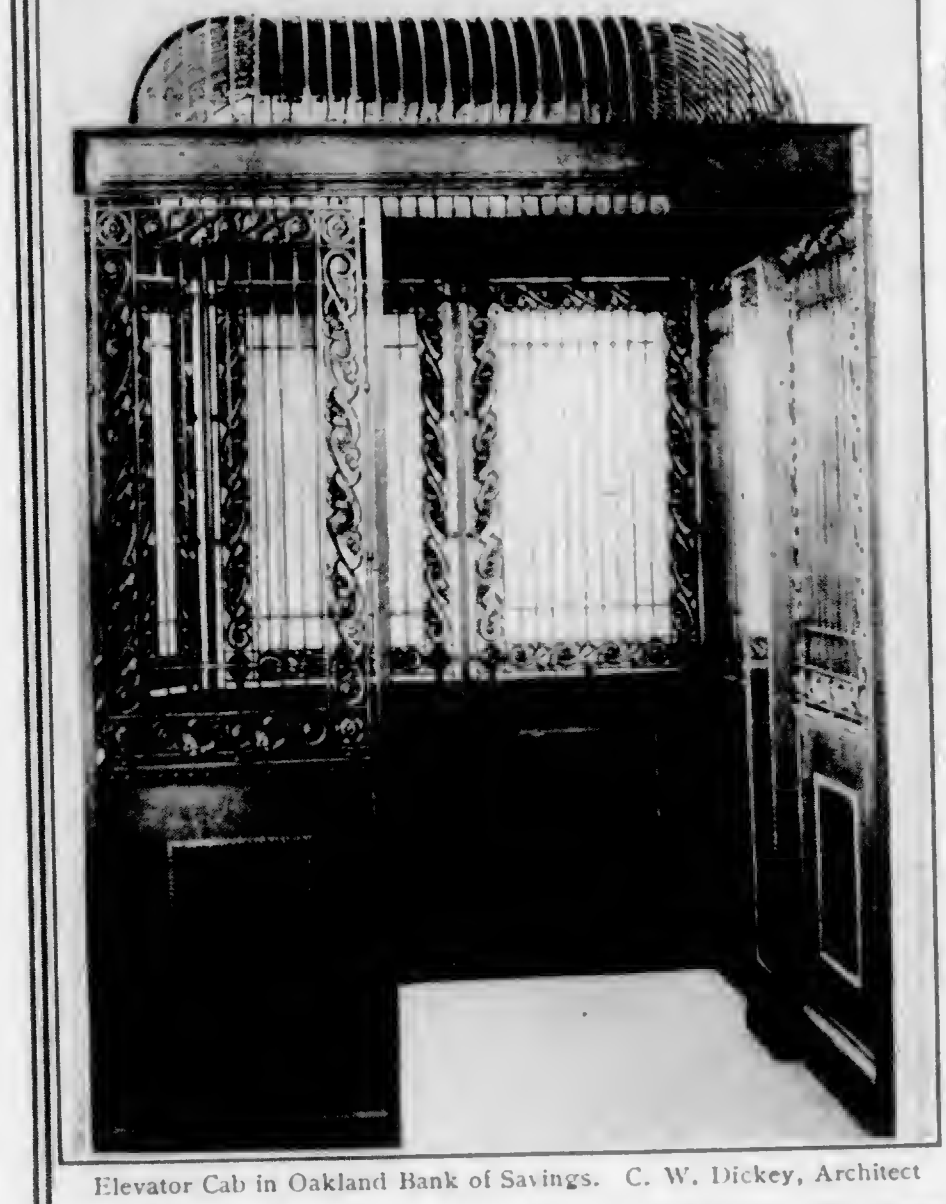

Elevator Cab in Oakland Bank of Savings. C. W. Dickey, Architect

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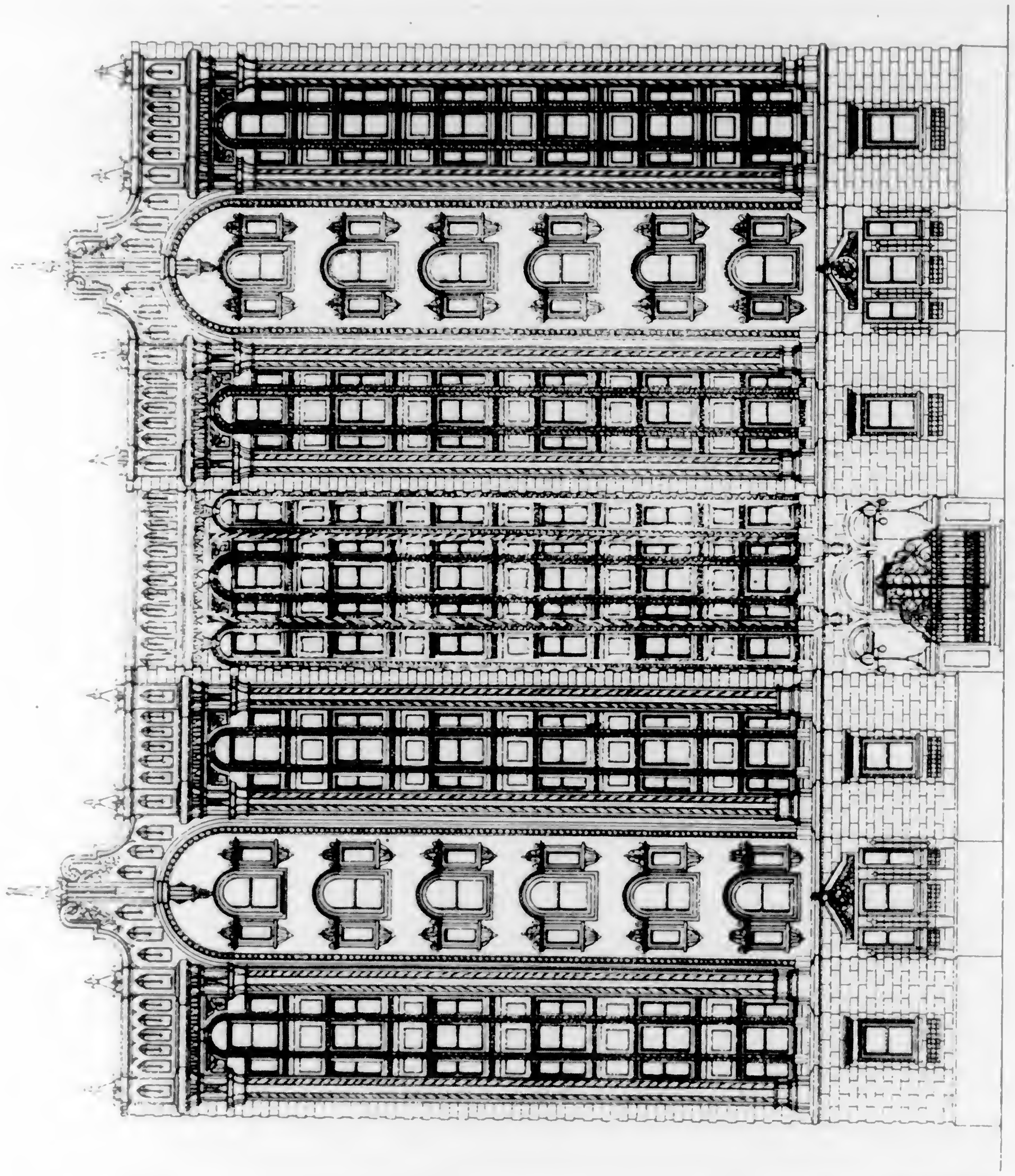


Front Elevation
The Northgate Apartments
Geary Street
San Francisco
Fred J. Berg, Architect

Frontispiece,
The
Architect and Engineer of California
November, 1908

THE
Architect and Engineer
Of California
Pacific Coast States

VOL. XV. NOVEMBER, 1908. No. 1.

National Architecture.

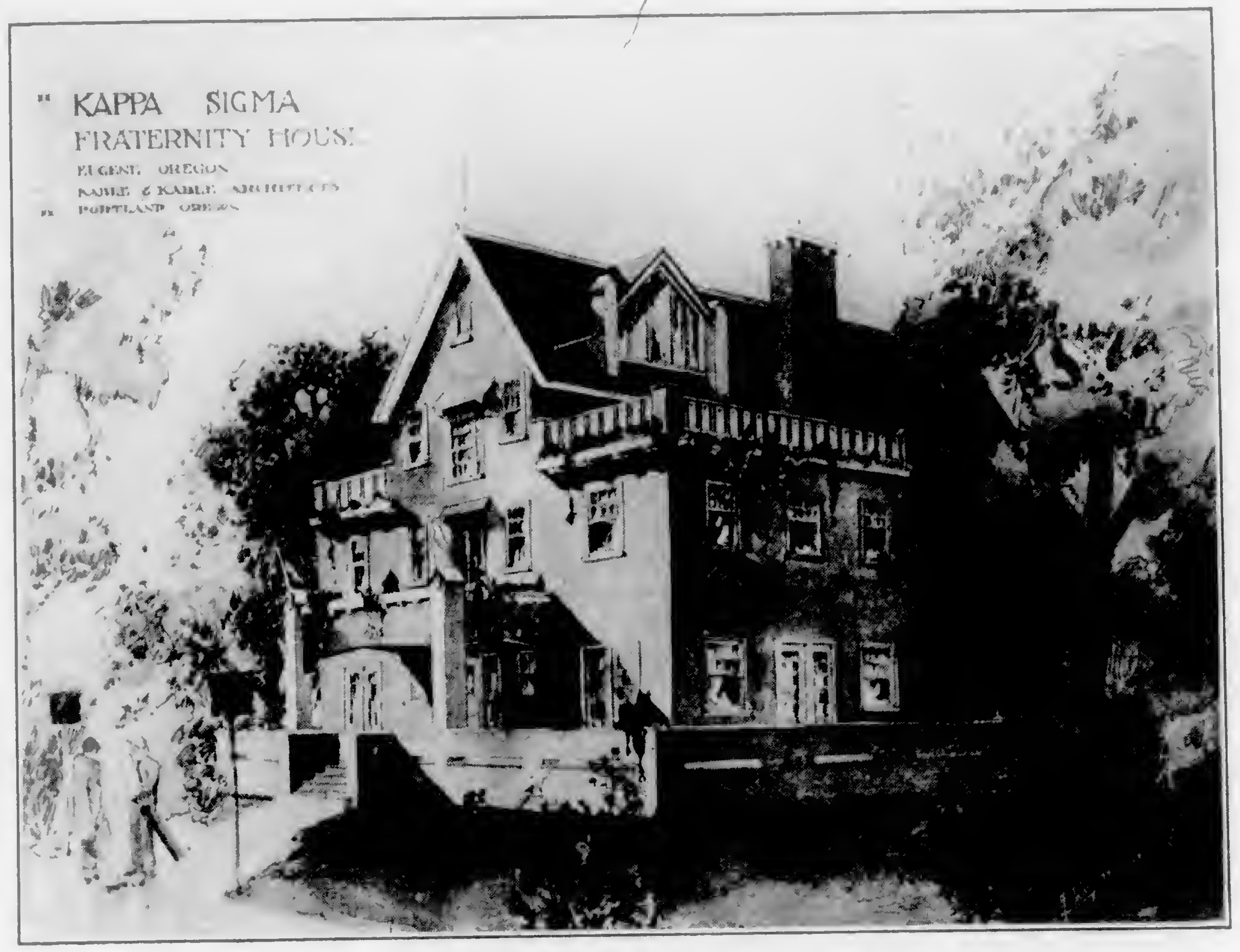
By FRED J. BERG, Architect.

NO STUDY, perhaps, opens more extensive or prolific sources of instruction and entertainment, or has larger claims on the public mind, than that of architecture. It is both a science and an art. As a science, it comprehends the various branches of mathematics, geometry, arithmetic and mechanics; and also chemistry, mineralogy, botany and practical philosophy in general, a knowledge of all of which will be necessary in composition, construction, design and execution. As an art, besides the skill of the practical mathematician, mechanic and philosopher, it requires imagination, invention, in brief the genius and feeling of the artist; and, indeed, calls in the aid of the other fine arts, painting and sculpture, of which it is the patron and protector.

The inquiry is often made, what architecture must a nation, situated as ours is, adopt? It has no indigenous architecture; it is not, therefore, a matter of religion with us, but a matter of taste. We may and must have all the architectures of the world, but we may ennoble them all by an attention to truth and a contempt of littleness. Nay, is not our position, if we will use our advantages properly, the more fortunate, as we are not by the force of circumstances or example, bound to build in this or that particular way, but all ways are before us to choose. If our position is unfavorable to a speedy development of national taste, it is most adapted to give fair play to the individual. The great error with us generally is, the doing of unmeaning, needless things. There should be a purpose and a reason for everything in building. A structure should be designed, first of all, with reference to utility, or convenience; and afterwards ornament may receive its proper share of attention. Fitness for the object in view, and an expression of appropriateness, are indispensable to the completeness of any building, whether in its proportions or its decoration. To this end the size of the different parts must be carefully adjusted to each other, and to the whole, in order to produce an impression of symmetrical beauty. Ornament is worse than useless, unless it be in perfect keeping with the architectural style and the peculiar character of the building on which it is employed. The ancients weighed these points most carefully. Thus, to use the illustration of Alison, the Tuscan is distinguished by its severity; the Doric by its simplicity; the Ionic by its elegance; the Corinthian and Composite by their lightness and gayety. To these characters their ornaments are suited with consummate taste. Change these ornaments; give to the Tuscan the Corinthian capital, or to the Corinthian the Tuscan, and every person would feel, not only a disappointment from this unexpected composition, but a sentiment also of impropriety, from the appropriation of a grave or sober ornament, to a subject of severity. It is only when a bold and fertile invention, systematic and elegant proportions, pure and classical ornaments, are all combined in a design, that it becomes effective and pleasing. When they are united, we feel irresistibly impelled to rank architecture among the most exalted of the arts; and to coincide with the strong assertion of Brittion, that a magnificent and appropriate edifice is the noblest, the most important, and the most transcendent work of man; when nearest to a state of perfection, it exhibits his genius, science and talents, in a proud and dignified point of view; for such a building is a masterpiece of human invention and elaborate workmanship.

It has been justly observed that the public at large has a claim over the architecture of a country. It is common property, inasmuch as it involves the national taste and character; and no man has a right to pass off his own barbarous inventions as the national taste, and to hand down to posterity his own ignorance and disgrace, to become a satire and libel on the knowledge and taste of his age. There is, perhaps, no subject on which persons are more apt to differ in their opinions than on the beauty of a building. In architecture the creative power of Nature herself is the model imitated. It is an art which appeals directly to the understanding, and has not the means of flattering the senses in the same way as the sister arts; hence its productions are not universally appreciated. The beautiful models of Nature, however, are the index and guide of the painter and sculptor; a successful imitation of these models, even without an advance on the part of the artist towards those higher intellectual beauties which distinguish the historical painter, is capable of affecting us with very agreeable sensations.

Designed with skill and taste, and constructed of durable materials, and in accordance with the laws of science, the architectural works of a nation become its proudest and most lasting monuments. They are an index of the state of knowledge and social progress in a country, and in many cases have transmitted its only history. There is no object on which the resources of the wealthy are more freely lavished, or which calls out more effectually the inventive talent of the artist. The painter and the sculptor may display their individual genius in creations of surpassing excellence, but it is the great monuments of architectural taste and magnificence that are stamped in a peculiar manner by the genius of a nation. The Greek, the Egyptian, the Saracen, the Gothic—what a key do their respective styles afford to the character and condition of the people. The monuments of China, of Hindustan, and of Central America, are all indicative of an immature period, in which imagination has not been disciplined by study, and which, therefore, in its best results, betrays only the ill-regulated aspirations after the beautiful that belong to a semi-civilized people. We have it in our power to embody in enduring stone a record of our national character and history; to commemorate by the utility, durability and beauty of our edifices the political strength and moral elevation to which we have attained; to leave behind us, in these unerring witnesses, proofs of our refinement, opulence, science and progress in the useful arts. Do we desire that a remote posterity shall look back upon us with the admiration that we award to Egypt, Greece, Rome and Christian Europe? If we do, let us render to our architecture the homage of earnest study, cultivated taste and matured judgment.



Kappa Sigma Fraternity House, Eugene, Oregon

Kappa Sigma Fraternity House, University of Oregon

By KABLE & KABLE, Architects and Engineers

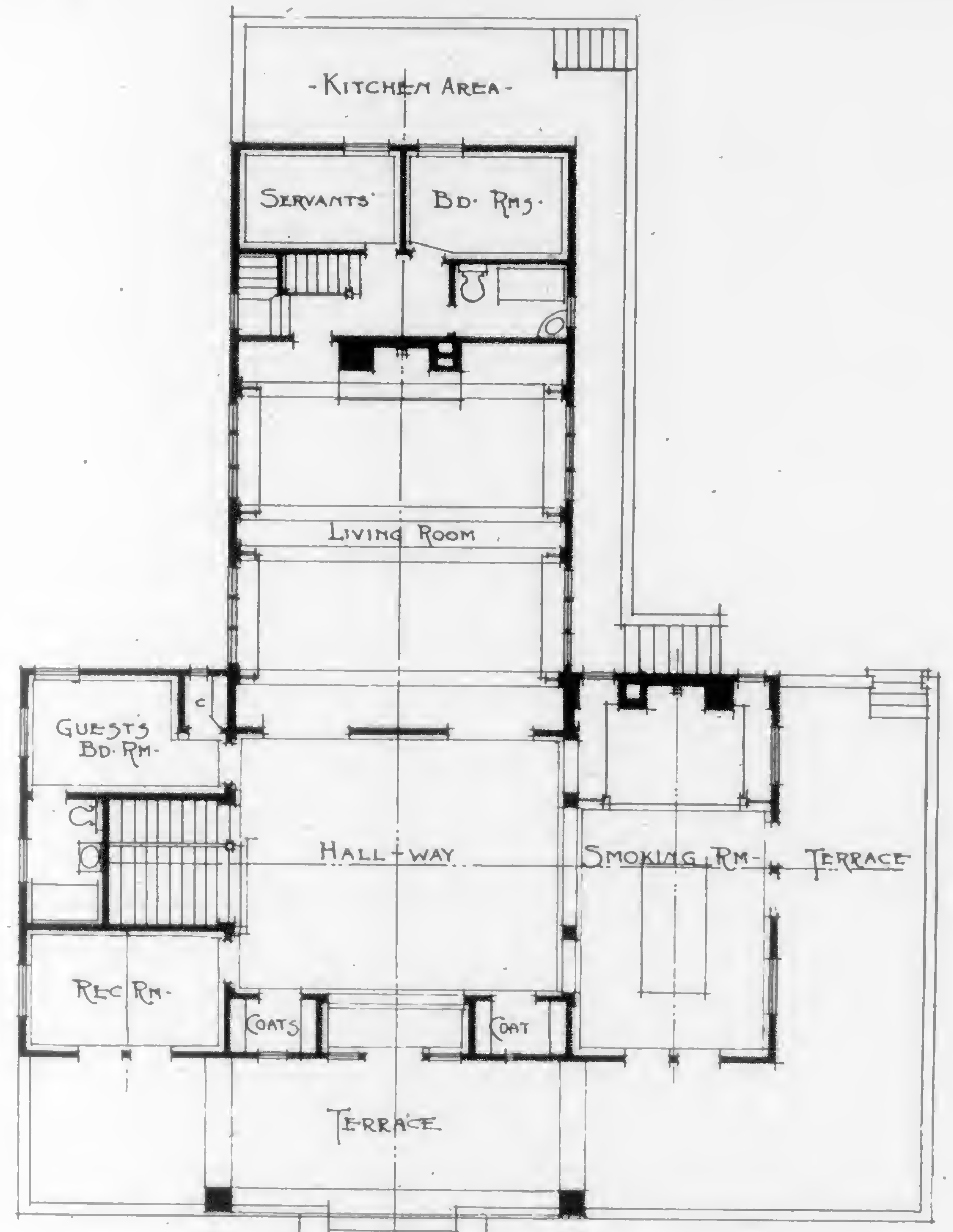
IN THE designing of a fraternity house there are several important points to consider which differ from a large dwelling or a public club house. It must express the conditions which environ it, and the functions which it serves. It also must be fraternal in spirit, individual and characteristic in style. The interior arrangement should be such that a large number of people may be entertained, should occasion demand, without commotion or confusion. Hence the principal rooms open off the hallway with large arches.

The spacious living room, which is placed to the rear of the hallway, has large windows either side with seats beneath and a large fireplace at the far end. To the back of the living room are the servants' quarters, and a stairway connecting all floors. To the right of the entrance is a smoking room with an ingle nook in one end, and is sufficiently ample for a billiard table in the other. Adjoining the front entrance on either side are coat closets. To the left of the entrance are the reception room, guests' bedroom and main stair. The wide terrace which extends across the front and side is reached from the principal rooms by French windows.

The dining room is ideally located in the basement, being well lighted by areas.

The lodge room is located in the attic, being well secluded for the purposes for which it is used.

The second and third floors are reserved for sleeping compartments and studies, the rooms being arranged into a series of suites, single bedrooms and double bedrooms, the idea being to provide a variety of rooms so that any student may make his own selection.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Living Room
Guests Bd. Rm.
Hall-way
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Terrace

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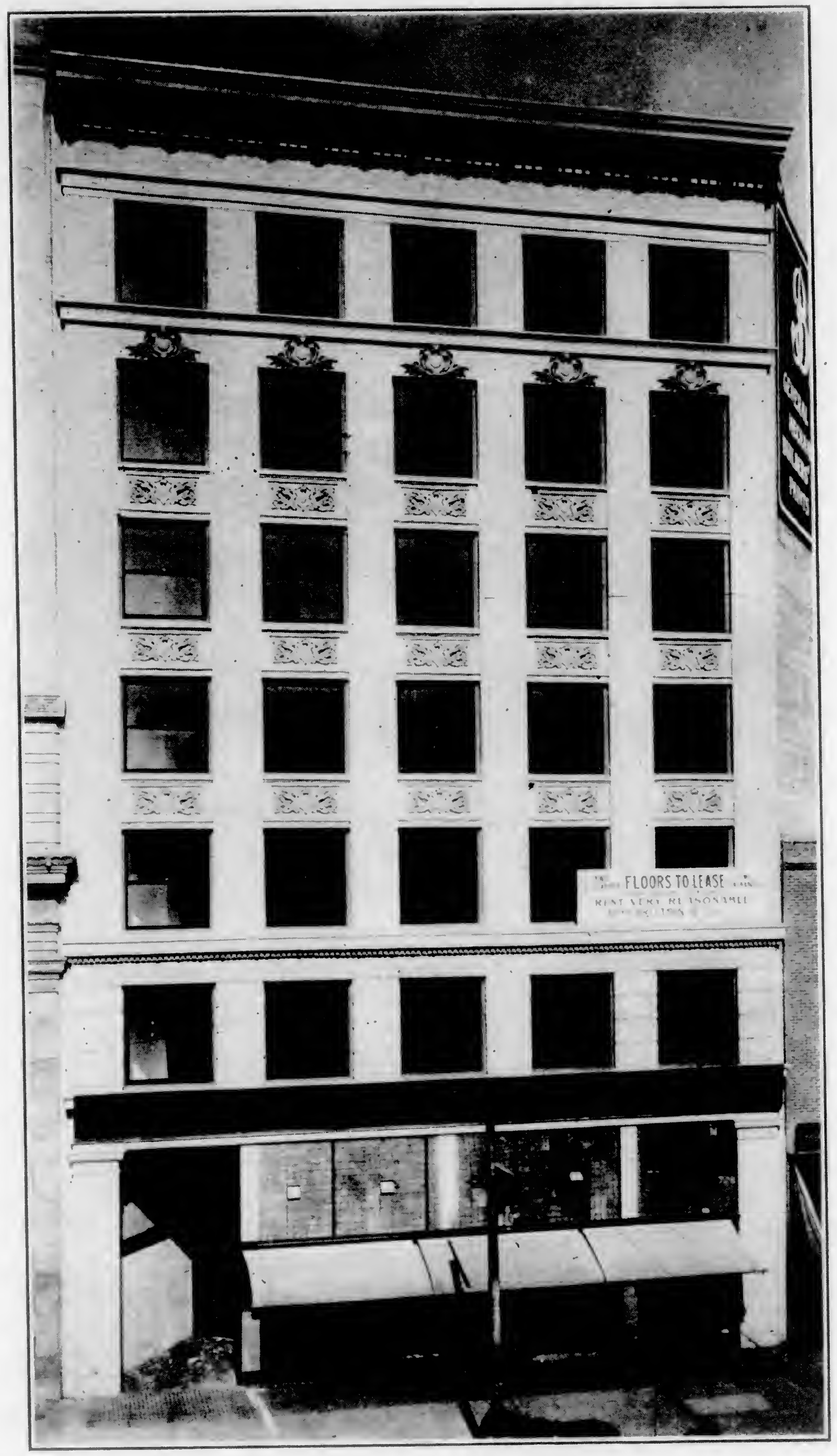
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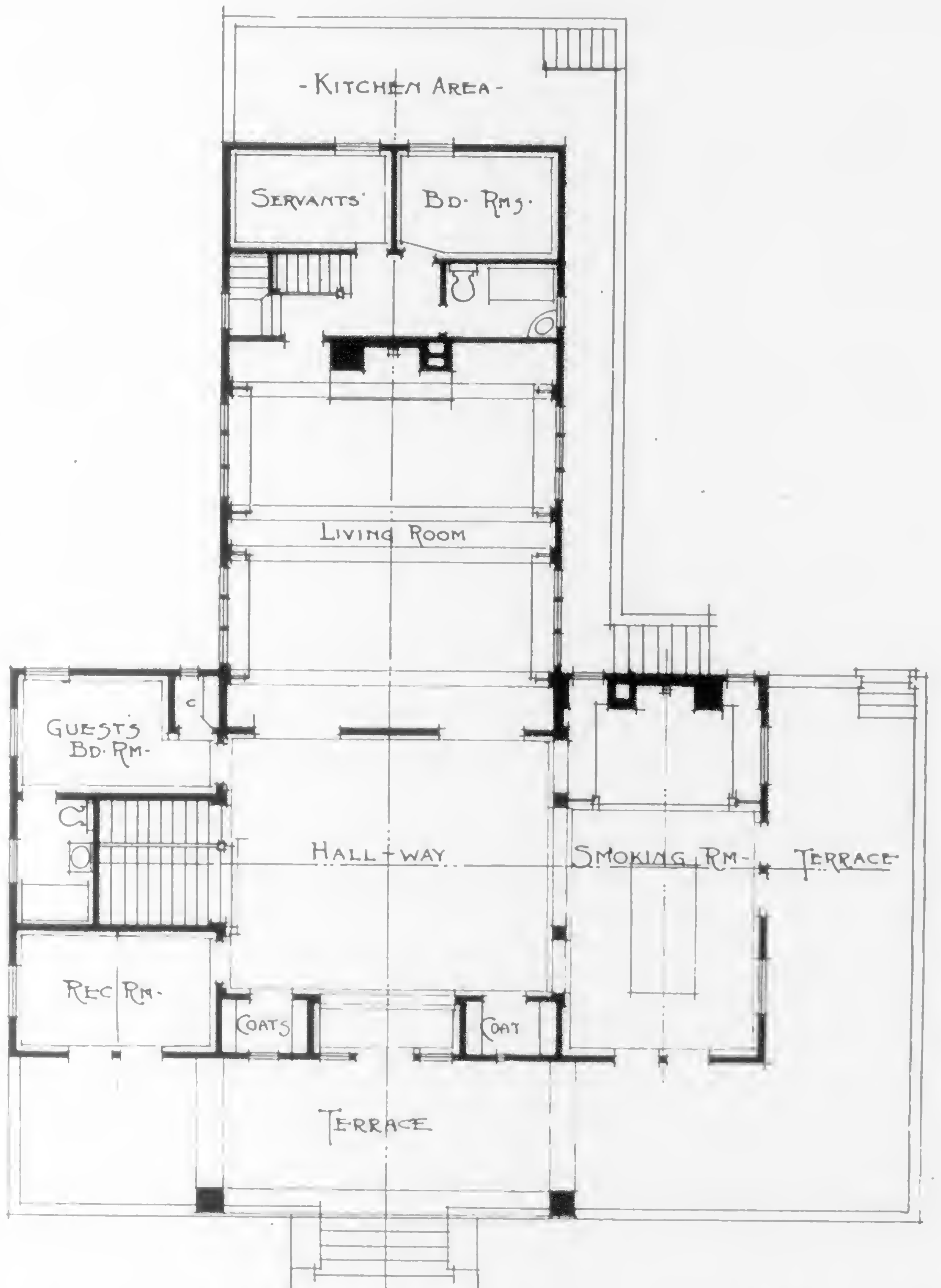
KITCHEN AREA
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GUEST'S BD. RM.
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COATS
COAT
TERRACE

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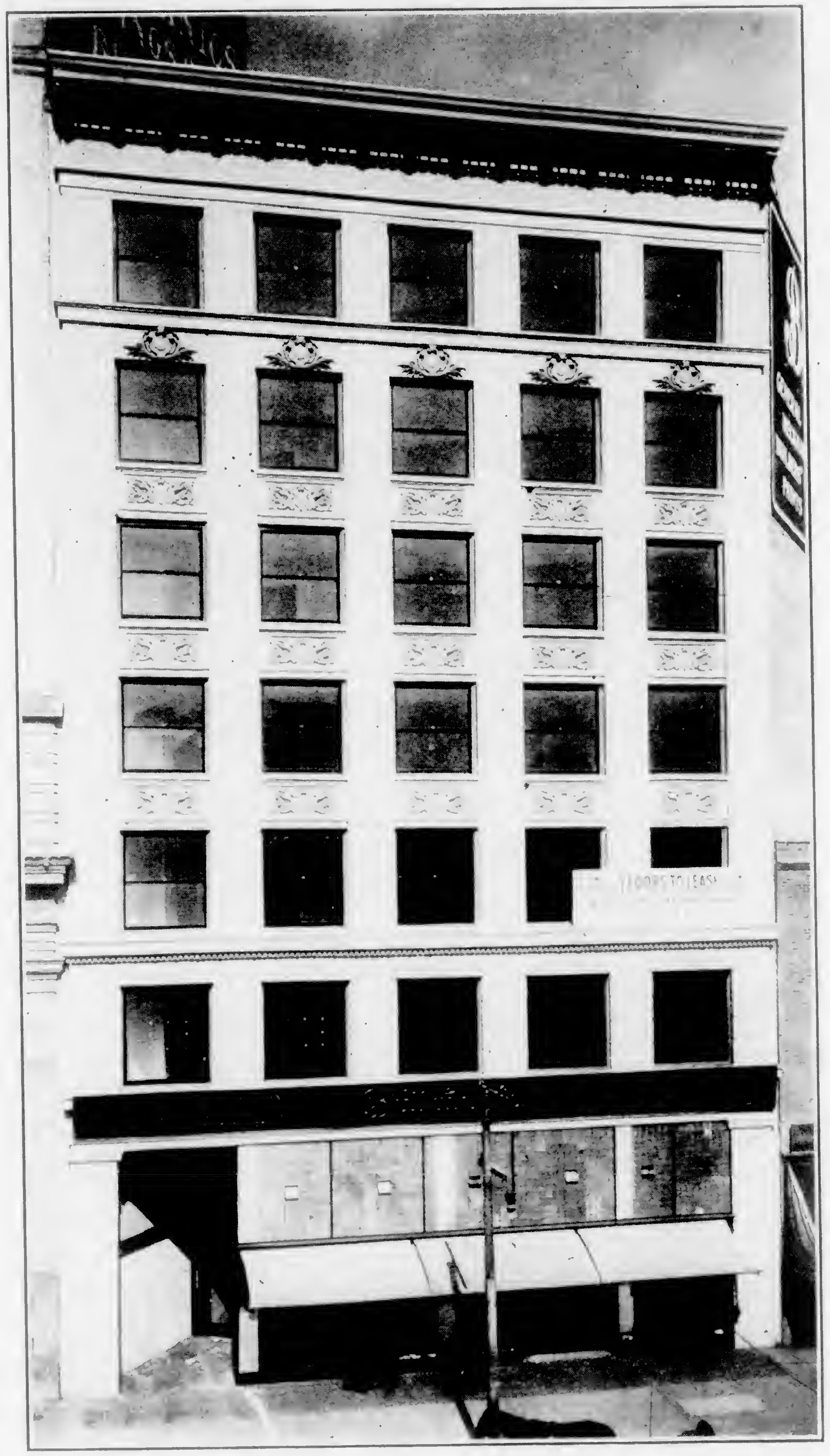

Drexler Building, San Francisco
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The New Office Building for the House of Representatives at Washington, D. C.

Office Building for the House of Representatives, Washington, D. C.

THE new office building for the House of Representatives, at Washington, D. C., is located on Square 690, immediately southeast of the Capitol building. It is planned in the form of a hollow square, the open part in the center being a court nearly 300 feet in diameter. In conformity with the design of the Capitol building, the principal front of the House office building shows three stories above ground, but the grade falls away so rapidly on New Jersey avenue and First street that the rear front is five stories above ground, the lowest story being the sub-basement on a level with the street and court.

The offices on each floor are arranged in a double row, separated by a corridor twelve feet wide. The outer rows of offices face the four streets, while the inner rows open on the court. Four stories are devoted to offices, the first, second, third and fourth. The sub-basement or cellar is given up to storage and other purposes connected with the administration and operation of the building.

The offices average 23½ feet deep and 16 feet wide, and there are 397 of them. The present membership of the House, 60th Congress, is 396 (members and delegates), so that there is one office for each.

In addition to the office rooms, fourteen large rooms have been set aside for the possible use of committees which may be moved to the new building from the Capitol.

Each office room is floored with cement, laid off in squares, the walls are finished in buff plaster, "sand finish," and the cornice and ceiling in smooth white plaster. The wood finish consists of a baseboard and near the ceiling a picture moulding, with architraves around the doors. There is no wood finish around the windows, the plaster being turned in against the window frame. The woodwork is painted white and the doors are mostly of mahogany.

At the corridor end of each room are two flues, one each side the doorway, enclosed in terra cotta. One of these is a heat flue, by means of which the office room is supplied with tempered fresh air through a register near the ceiling. The room is ventilated by drawing out the air through a register in the other flue, placed near the floor and concealed under a lavatory. One flue being near the ceiling and the other near the floor will cause a constant circulation of the air which enters the room through the heat flue. To avoid drafts, the system has been so designed and the sizes of the flues so proportioned that a very large quantity of moderately heated air can be introduced at a very slow rate, thus reversing the usual method of delivering to the room a minimum quantity of burned up air at a very high velocity. To overcome the tendency of the large expanse of glass in the window of each room to lower the temperature and thus create drafts, there has been provided a steam radiator in each window recess. These radiators being regulated independently of each other, it is possible for the occupant of any one room to control the temperature of that room in accordance with his own preferences.

The lavatory with which each room is equipped is placed against the ventilation flue at the corridor end of the room, all supply and waste piping being run inside the flue. These lavatories are supplied with hot and cold water, and, through a separate fixture, with ice water.

Against the heat flue is placed the telephone, as well as the outlet to which will ultimately be connected the call bell system. This system will ring a bell in each office room, coincident with the ringing of the "legislative bell" in the Capitol building.

All electric wires run in the heat flue. Both the heat and vent flues are accessible from the attic so that repairs and alterations to wiring and piping can be made without disturbing the plastering or other finish in any of the rooms.

Each room is lighted with a bracket light over the lavatory, another over the telephone, and two chandeliers. In addition, there are six outlets covered by nickel-plated brass plates, in the baseboard. Into these outlets plugs carrying electric wires can be inserted. This system will enable the occupant of a room to have a desk light no matter where he places his desk. It results, also, in freeing the walls of brackets, which could not be located just where they would suit the varying requirements of the occupants of the different rooms and which would also interfere with the placing of the necessary bookcases and filing cabinets against the walls.

The wiring of the rooms for lighting has been very carefully planned. The ceiling lights, the brackets on the end walls and the baseboard outlets in any one room are on four different "circuits." This means no one room can be plunged in darkness unless all four circuits "burn out" at the same time. This would be such an extraordinary coincidence that it may be said that it is impossible for any one room to be deprived of light, short of a breakdown in the power plant. As all the apparatus in the latter will be in duplicate, it would be necessary for the entire plant to go to pieces before the office building could be put out of commission.

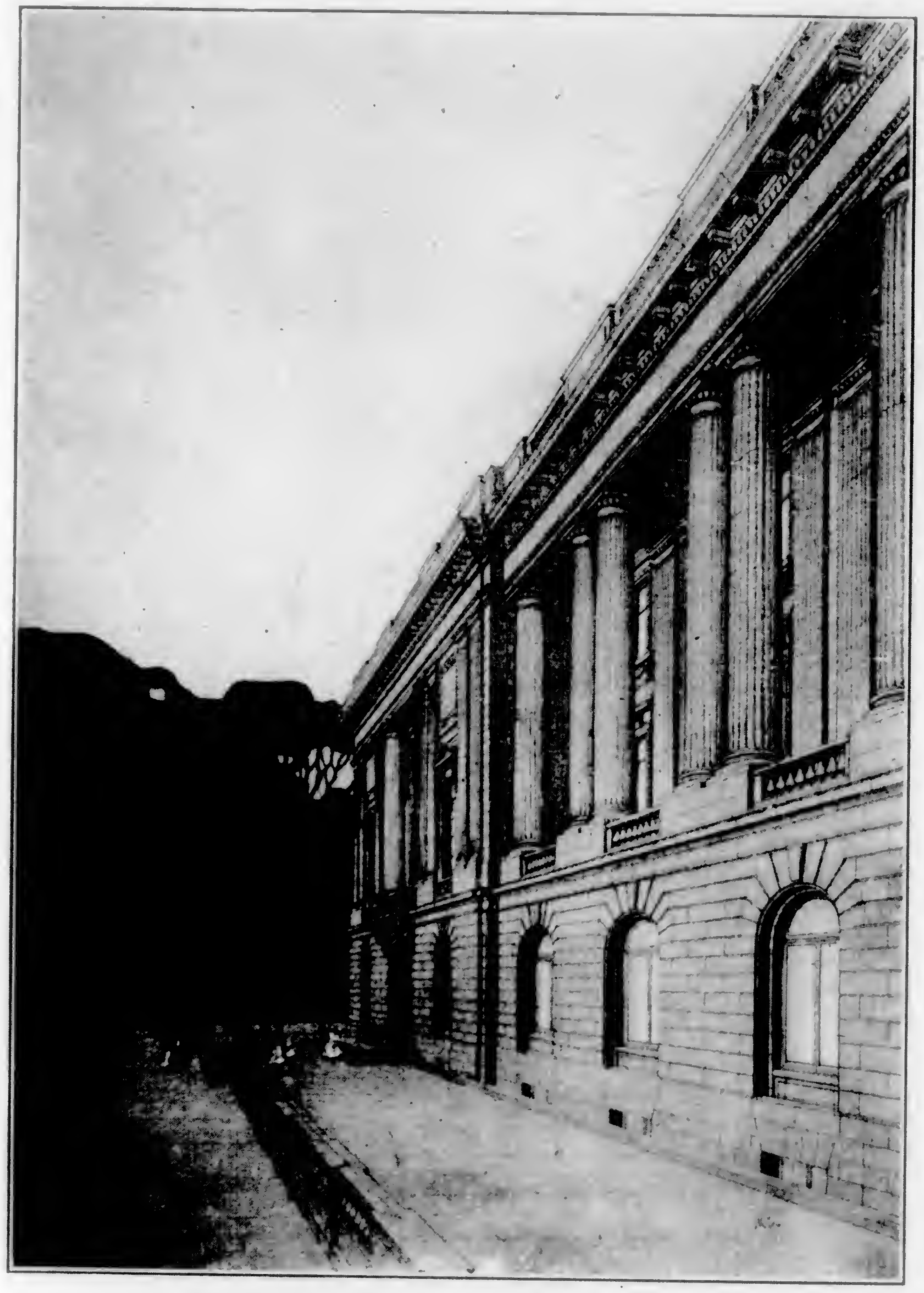
There will be three places of interest in the building which will be somewhat elaborate architecturally. These places are the rotunda, the main stair and the conference room back of the latter.

The rotunda is at the corner of B street and New Jersey avenue and is entered directly from above the street as a sort of large vestibule from which radiate, on either side, the B street and New Jersey avenue corridors. Between the radiating lines of the corridors will be seen the main stair, and, back of this, the entrance to the conference room.

The rotunda will extend from the street, or second office floor, through the entire height of the building, terminating with a dome under the roof. Architecturally, the rotunda consists of a circle of eighteen marble columns standing on a circular marble arcade, all enclosed in a circular wall, or shell. On the center line of the columns, the rotunda has a diameter of 57 feet 4 inches, while the diameter of the encircling wall is 75 feet 6 inches.

The height of the rotunda from the first floor to the crown or "eye" of the paneled dome is 68 feet. From this it will be seen that this rotunda will be of much smaller dimensions than the rotunda in the Capitol building.

Immediately back of the rotunda is a circular corridor connecting the



Office Building, United States House of Representatives, Washington, D. C.
Thomas Hastings, Consulting Architect

B street and the New Jersey avenue corridors and back of this is the main stair. This stair is really double, that is, it consists of two staircases facing each other and connected by a landing or passage by means of which the conference room is reached. The stair is what is known as an "intramural stair," that is, between walls, after the manner of the monumental staircases of the Italian Renaissance.

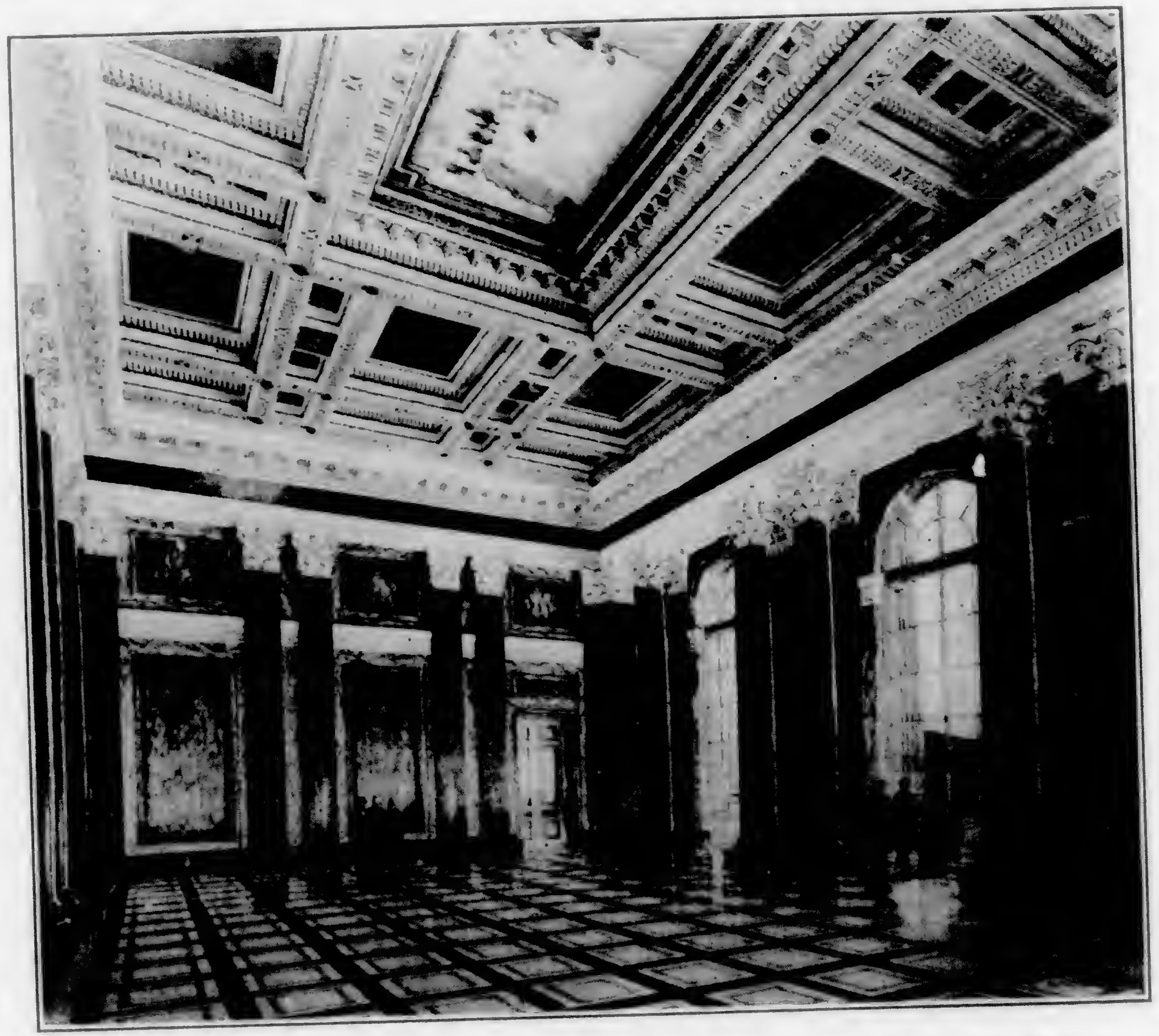
The conference room back of the main stair, is on the third office floor of the building and is 86 feet long by 54 feet wide.

On the floor below the conference room there is space available for a postoffice with accommodations for telegraph office and a public telephone station. Below that will be the barber shop for use of members. On the second office floor, at the southwest corner of the building, space has been set aside for a dining room, with its serving room, while around the corner, on C street, a café may be provided. The kitchen will be in the cellar. The dining room will seat 150 persons and the café 100 more.

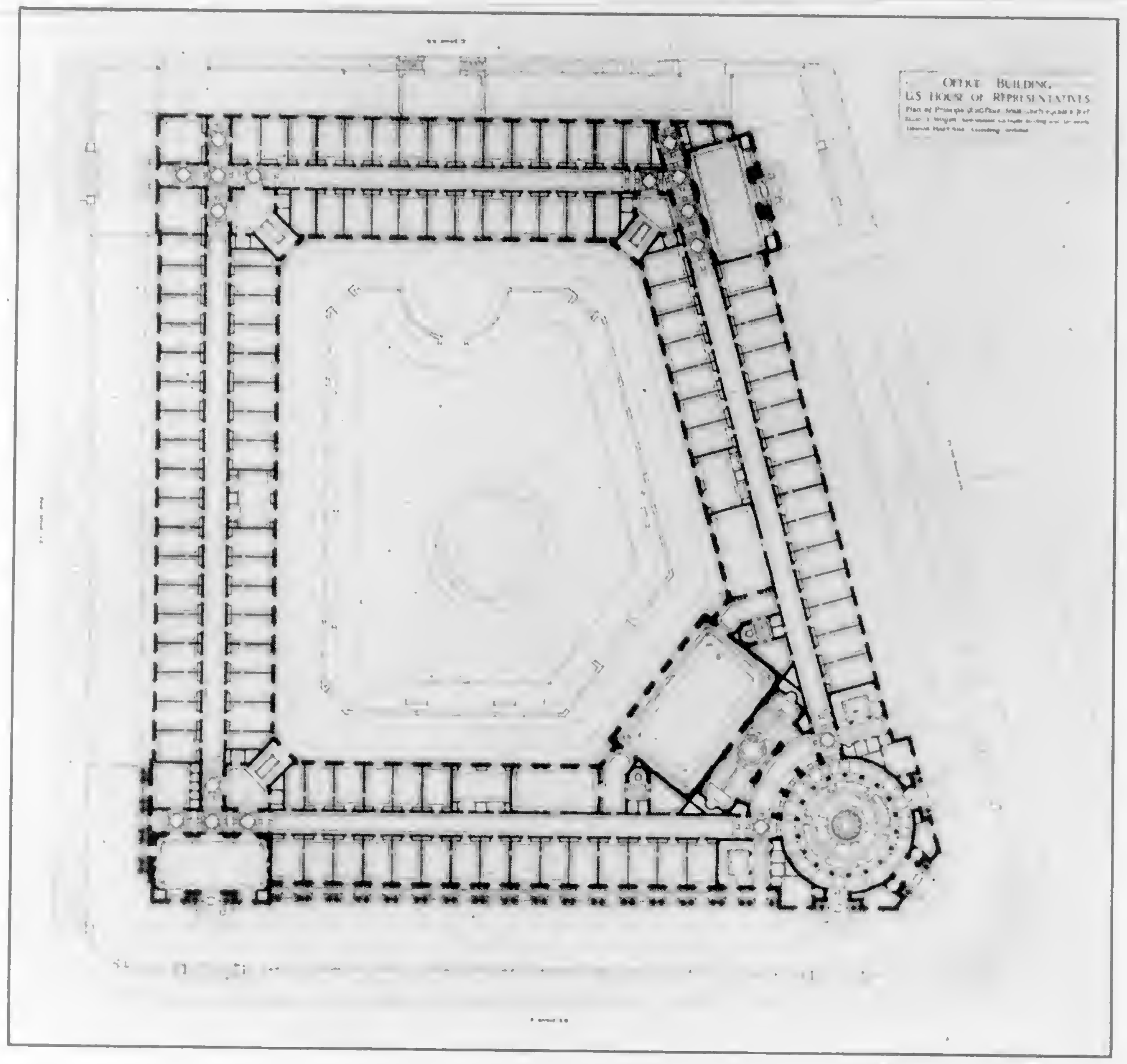
In addition to the entrances at New Jersey avenue and B street, already alluded to, there is an entrance on the street level at First and B streets, near the library of Congress. There are other entrances, on the first floor level, at New Jersey avenue and C street, and at First and C streets. In addition to these there are entrances on the court at the level of C street.

Because of the unusual dimensions of the building, it was necessary to devote considerable study to the disposition of elevators and staircases, in order that these might be arranged so as to provide ample facilities. With this end in view, there have been distributed through the building eight staircases and twelve elevators, which, it is thought, will meet all the demands both of the members of the House and such of the public as have occasion to visit the building. The staircases are so arranged that the windows which light them will assist in lighting the long corridors which separate the rows of offices.

The exterior of the building is classic in design. It suggests in its general division of parts the Garde Meuble on the Place de la Concorde,



Interior Office Building, United States House of Representatives, Washington, D. C.
Thomas Hastings, Consulting Architect



Principal Floor Plan, Office Building, United States House of Representatives, Washington, D. C.
Thomas Hastings, Consulting Architect

Paris, while the pavilions are modeled on those of the Colonnade du Louvre. Architecturally the front is divided into two parts, the lower story constituting a "rusticated" base on which, extending through the two upper stories, is the colonnade, surmounted by its entablature and balustrade. The colonnade on B street, between the two flanking pavilions, is 292 feet 7½ inches long, and is made up of 17 "bays" with 16 pairs of Doric columns and with a single column at each end, making 34 columns in all. Elsewhere, on the pavilions, there are 18 additional columns, a total of 52. Each column is 29 feet high, 3 feet 5 inches in diameter and rests on a base or pedestal 3 feet high.

On New Jersey avenue there is no colonnade as on B street, but the colonnade is "recalled" by employing pilasters. The C street and First street facades are without columns or pilasters except at the extreme north end of First street, where there is a short colonnade of eight columns. The court facades are also without columns or pilasters.

The building is of old-fashioned masonry construction, as distinguished from the "skeleton" type now usually employed in the construction of office buildings and "sky-scrapers." The walls are faced with stone, "backed up" with brick and the floors are carried on steel beams resting on the stone-faced exterior, and the solid brick interior walls. Between the beams is the floor construction of reinforced concrete. The contract for the exterior stonework and the rotunda and main stair was awarded to

B. A. & G. N. Williams of New York City. The B street and New Jersey avenue fronts are faced with South Dover, N. Y., marble, the C street and First street fronts are faced with Georgia marble, the court fronts with Bedford, Indiana, limestone on a basecourse of granite, and the rotunda is of South Dover, N. Y., marble. This is the largest single cut-stone contract ever executed in this country, and called for the furnishing and setting of between 285,000 and 290,000 cubic feet of stone. The amount of contract was over $1,100,000.

The Government furnished the brick, cement and sand required in backing up the stonework and in constructing the interior walls and contracted for the labor of laying the brick.

The construction of the House office building is under the personal supervision of the Superintendent of the Capitol Building and Grounds. All drawings required in the construction of the building were made in a drafting room near the site of the work, subject to the criticism of the consulting architect, Mr. Thomas Hastings of the firm of Carrere & Hastings, New York.

* * *

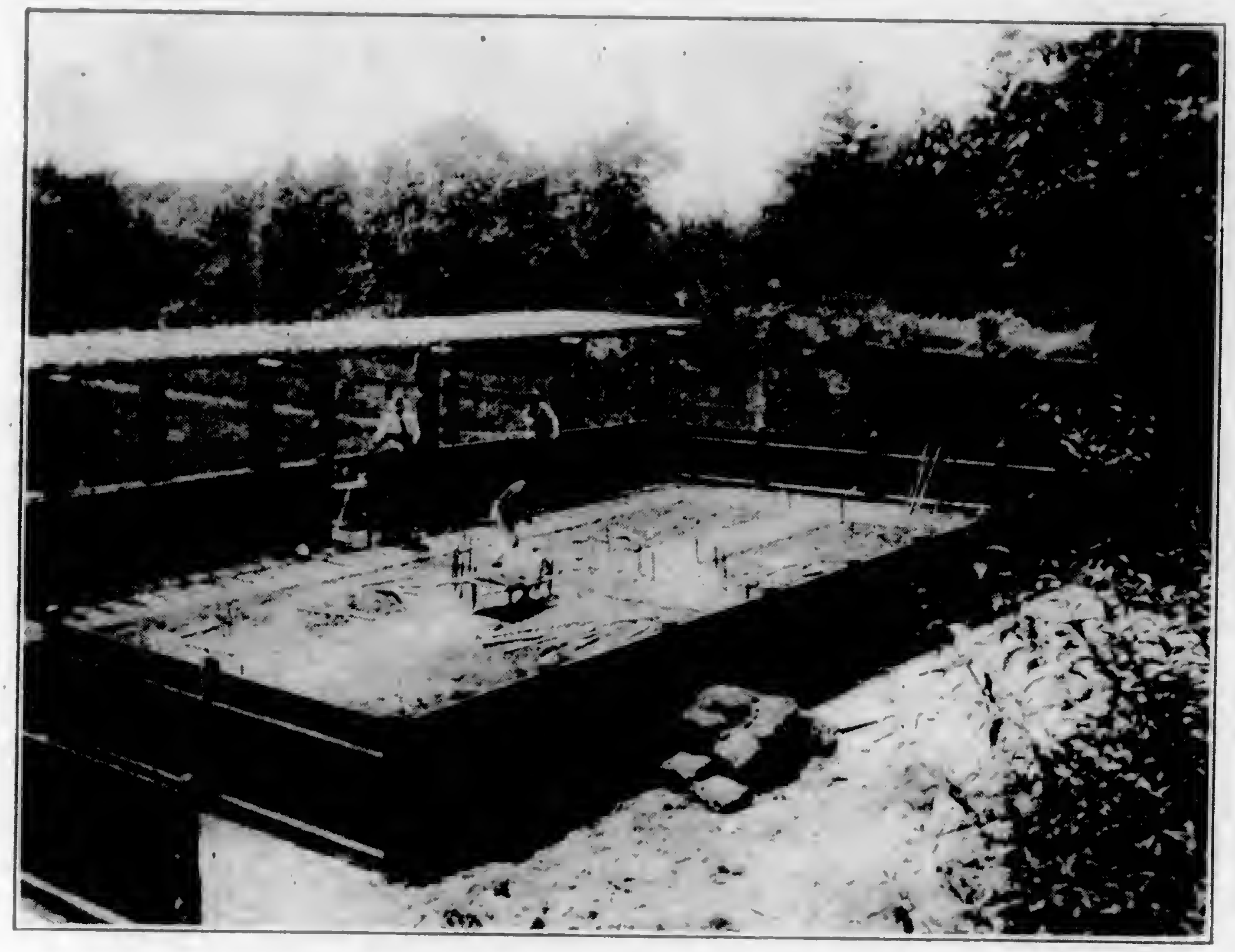
Losses by Marine Borers on the Pacific Coast

MARINE wood borers, which attack piling and other timbers placed in salt water, are causing the engineers in charge of the construction of marine works on the Pacific Coast much concern. They are particularly destructive along the coast from Southern California to Alaska, and shippers are beginning to realize that a cheap preservative treatment for this class of material would secure a big saving. On the average, an untreated pile lasts in these waters not more than three years.

A great deal of time and money have been spent by individuals and corporations in an effort to prolong the life of these timbers. Different styles of pile casings, made of copper, zinc, cement, and other materials, have been constructed and patented, and at the present time piles thus encased are under observation in many localities. Results will be watched with great interest.

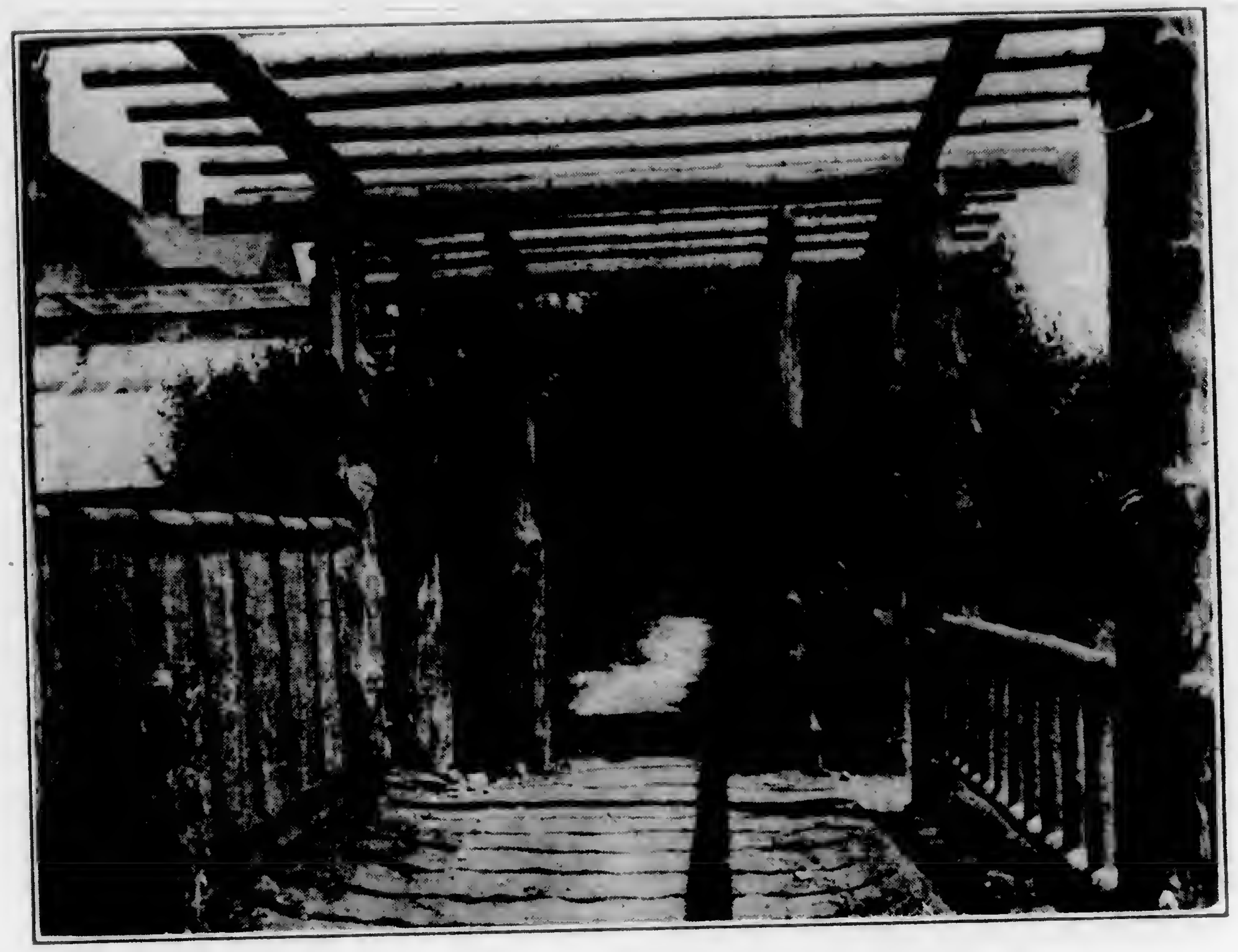
In addition, much work has been done in developing a preservative treatment to prevent the attack of the borers. This consists in impregnating the pile with creosote or dead oil of coal tar. When the piles are open-grained, and the oil has been of a proper quality and has been correctly injected, this plan has probably given the best results. It is true that a great many piles treated with creosote have been attacked by marine borers and destroyed, but in such cases there is usually a good reason to account for the failure. For instance, the use of timber of such density that the preservative cannot be forced into it, the use of green timber, the lack of sufficient preservative, or the use of a preservative of inferior grade may prevent the treatment from being completely successful.

Along the Pacific Coast, particularly in California, large quantities of yellow pine are found. This timber embodies all of the characteristics of a good pile timber, with the one exception of durability. Western yellow pine is open-grained, and lends itself readily to a successful preservative treatment with creosote. There is no good reason, therefore, why this timber should not be used to replace Douglas fir wherever the yellow pine can be obtained at a reasonable cost. Details of the work of the Forest Service along this and similar lines can be obtained on request from the Forester, at Washington.



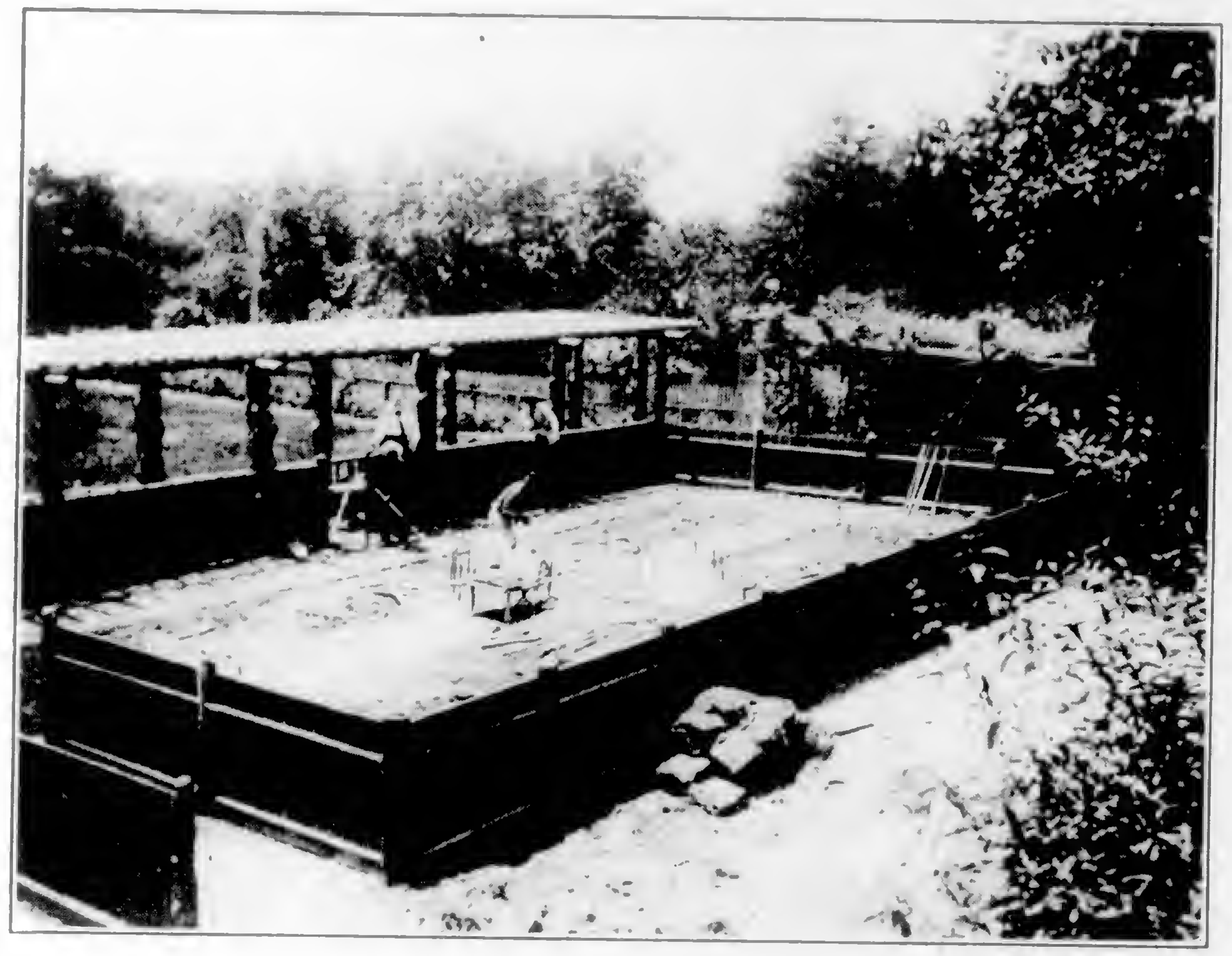
A Rustic Pergola Under Construction

View of Same Pergola from Rose Garden Five Years Later
W. D. Cook, Jr., Landscape Architect



View of a Rustic Pergola Immediately After Construction

View Through Same Pergola Five Years Later
W. D. Cook, Jr., Landscape Architect



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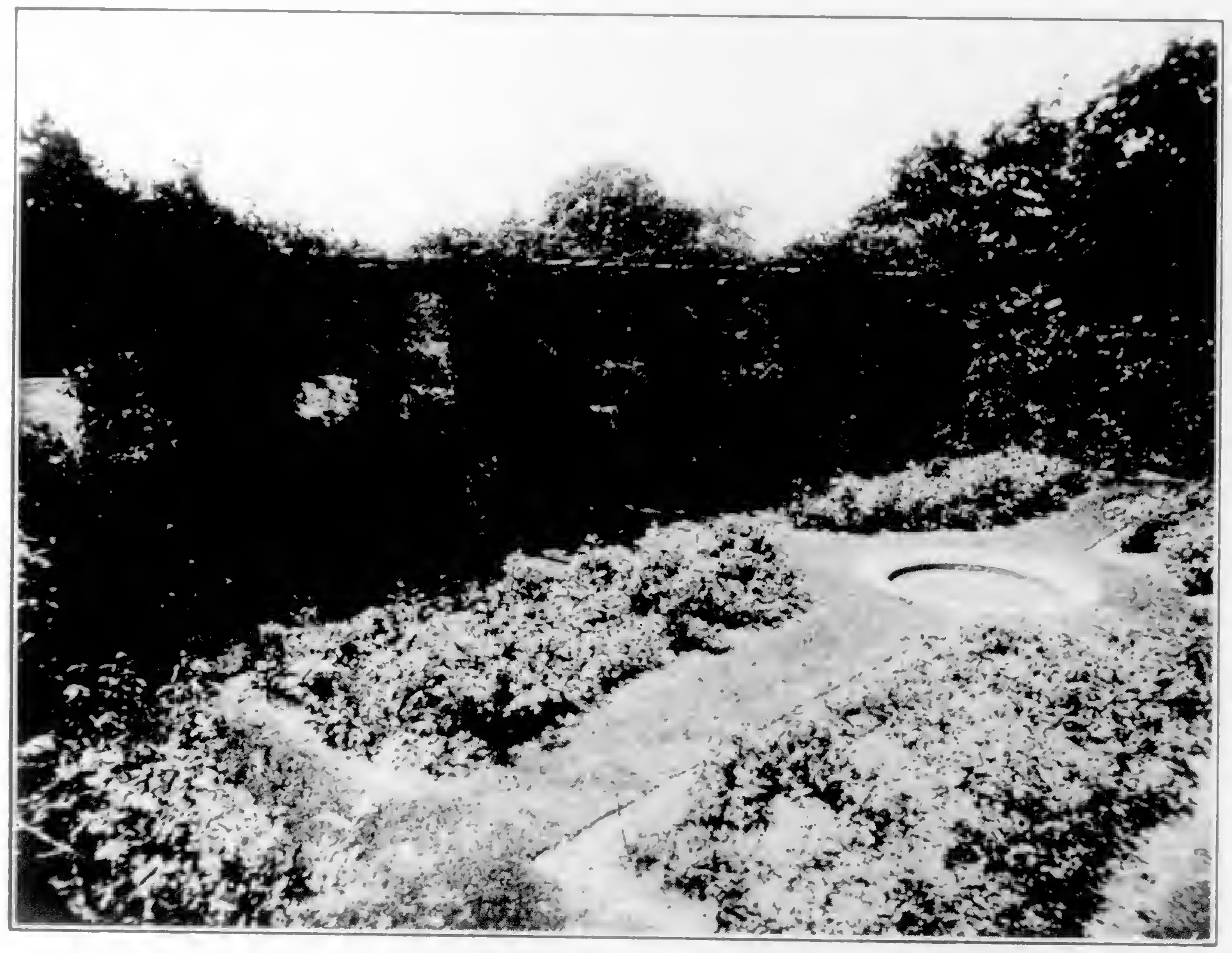

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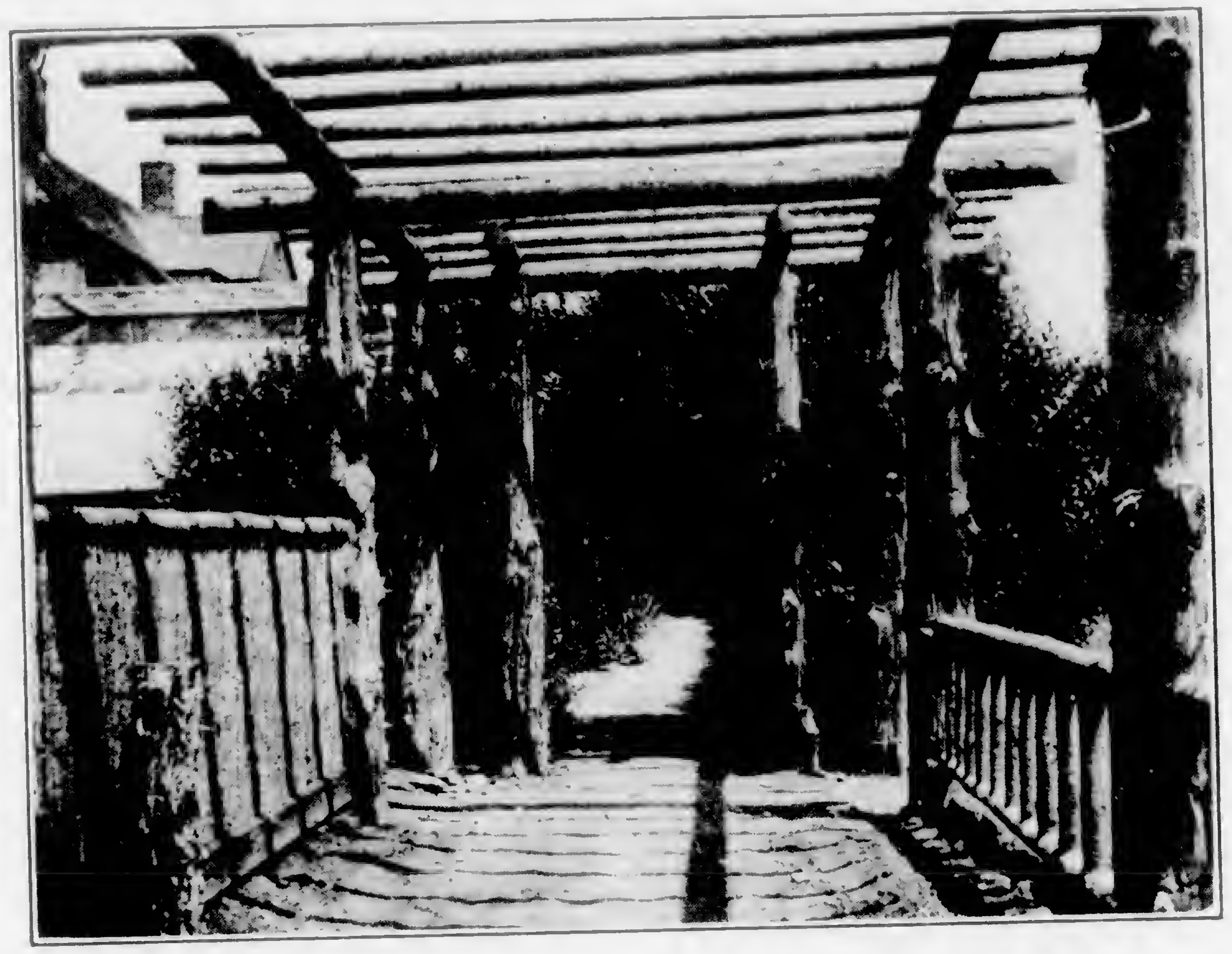
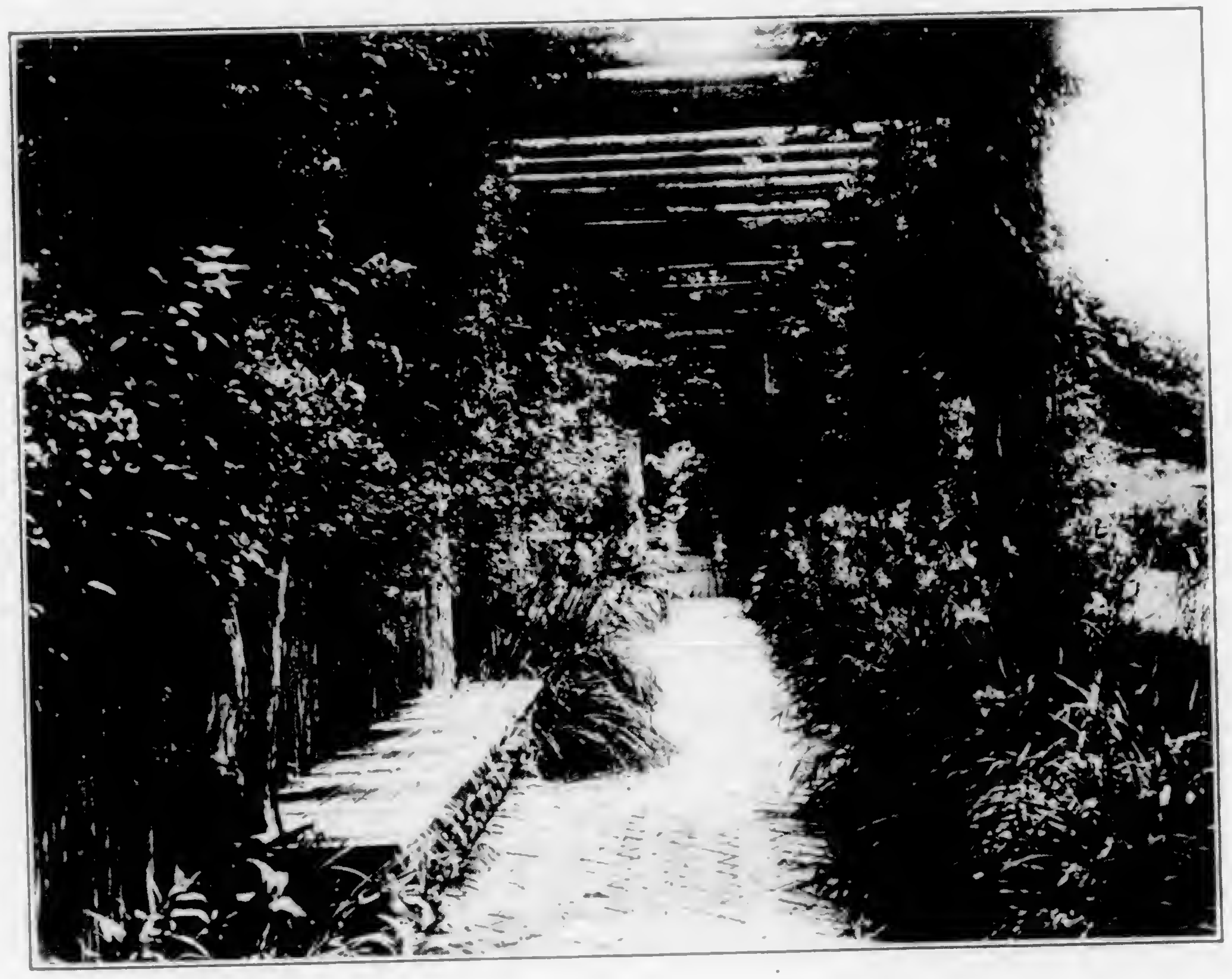


View of a Rustic Pergola Immediately After Construction



View Through Same Pergola Five Years Later
W. D. Cook, Jr., Landscape Architect

Beverly Hills Water Garden, Central Park, New York

The Rustic Pergola

By WILBUR DAVID COOK, JR., Landscape Architect

ACCOMPANYING this article are photographs of a rustic arbor or pergola which the writer had the pleasure of designing while associated with the Olmsted Brothers of Brookline, Mass., for a client at Irvington-on-the-Hudson, N. Y.

This pergola differs so much in character from those ordinarily built in California that it may prove of interest to your readers to note the difference.

With all due respect to our architectural brethren, the writer does not like the type of pergola as it is usually built. For instance, most of the California pergolas are made either with stucco or brick piers surmounted with eucalyptus boughs. I contend that this treatment is not altogether honest nor in keeping with the character of the structure. Frankly, it is neither one thing nor the other. If any portion of the pergola is to be given such apparent permanent construction as a brick or stucco pier the rafters should be architectural in treatment with ornamental ends.

The writer's argument is that the pergola should not be so covered with vines as to hide this incongruity of treatment; in fact this incongruity should never exist. The true beauty of a pergola is the partial concealment of its construction only, with the vines to soften the effect and to permit the sun to work out a delicate tracery of shadow on its walk below.

The true service of a pergola is primarily to provide a support for vines, to cover a walk connecting some feature of the house with the garden, to provide a semi-shaded sheltered place for seats, or to screen out some objectionable feature in its immediate vicinity.

If the pergola is a part of the house proper the character of its architecture will be controlled by the character of the house itself. The architectural effort to secure effects of contrast, say by white piers upon which to mass roses of a climbing character, it must be confessed, is very effective.

No matter how well your pergola may be covered with roses, there will be certain seasons of the year when more or less of the framework is bound to show, perhaps not as much nor for as long in this climate as in the east. When this occurs the incongruity of treatment stands out as a hollow mockery, and the mass of vines upon which the architect has counted to hide the difference in the character of the construction fails to accomplish its purpose.

The argument is that if any part of your pergola is to be of rustic construction it should all be rustic, or if any part architectural it should all be architectural. It is also realized that there is a scarcity of material here to secure the very best effects in rustic pergola construction. It is also realized that such pergolas have to be handled with care to avoid running to the grotesque.

The simpler the construction the more effective the result. Our favorite material for such a pergola in the east is red cedar or chestnut for the posts with the bark and nubbins left on (preferably red cedar) and with rafters of spruce, the ordinary bean pole being used for this purpose, with the bark left on. Dependence is placed upon the bark to form the color effect.

Galvanized iron nails are used in the construction and it may surprise the reader to learn that the pergola will outlast its hardware. A pergola of this kind will stand the wear and tear of our severe eastern winters for twenty years with little if any serious damage, the appreciable wear showing in the stripping off of the bark on the spruce poles. These can be replaced at a cost of $12 per hundred. The cedar or chestnut posts are practically indestructible if properly treated when set up.

These posts should be dipped in tar or creosote and set upon stones at their base to prevent underground rot. In a pergola of this character a brick flooring is ordinarily used, and is set on edge herring-bone pattern, soil pockets being left on either side of this flooring or walk and edged in with brick set on end. All bricks are bedded in a sand cushion varying in thickness from four to six inches, this cushion resting upon a rock or broken stone foundation of about eighteen inches thickness, and all floors pitch at the rate of one-quarter inch to the foot to shed water.

The pergolas are backed with spruce poles set as closely together as possible. Rustic seats are provided and furnished with oak slats for bottoms.

The particular pergola which is shown with this article forms a divisional line between the lawn and the rose garden. The rose garden is surrounded by a rustic fence to match the character of the pergola and is so different in construction as to be worth passing mention.

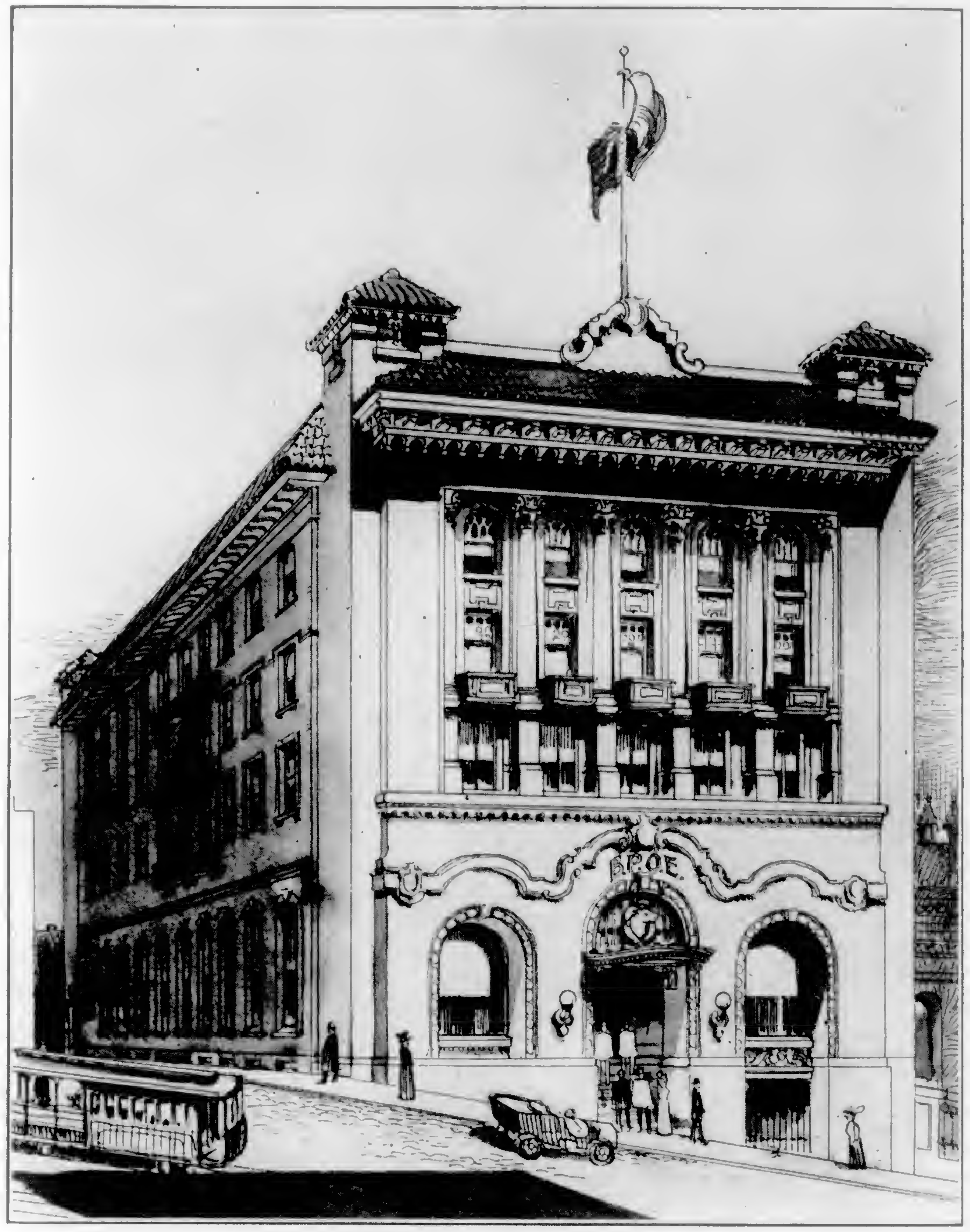
There is no back to this fence; in other words, it is finished alike on both sides. Spruce poles with the bark left on was used in its construction. The accompanying plans and photographs show its construction so well that no written description is deemed necessary.

The photographs showing the pergola covered with vines were taken five years after the completion of the pergola.

In the building of a rustic pergola the writer would suggest caution in the handling of the construction. Grotesque effects are to be shunned and honest straightforward construction should be followed, leaving Nature to soften its lines and time to mellow its tone.

In a later article the writer hopes to take up the construction of a rustic pergola which he believes is particularly adapted to this climate, and to state the material he is using in its construction.

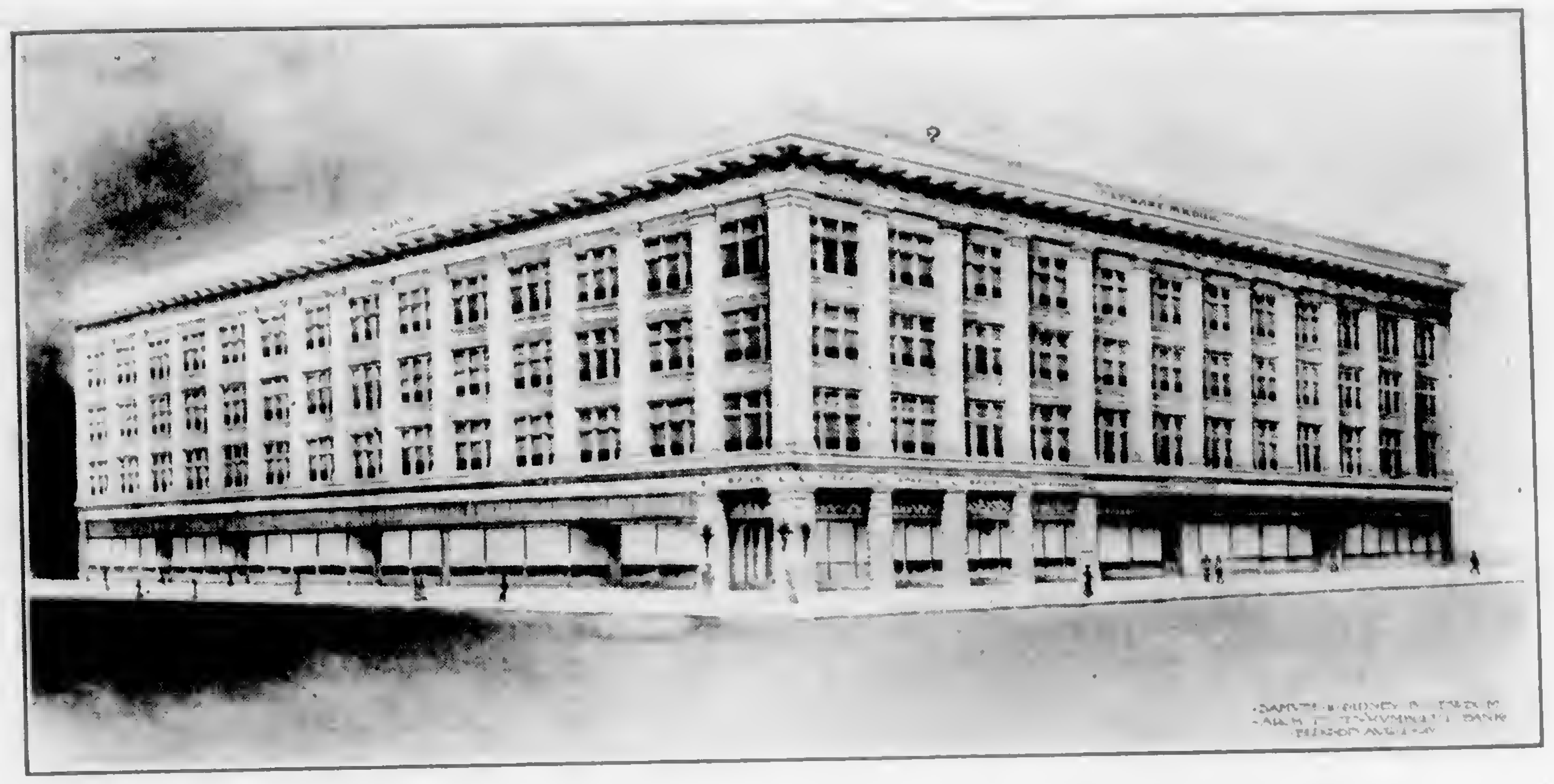
The cost of the pergola shown was approximately six hundred dollars, including labor and materials.



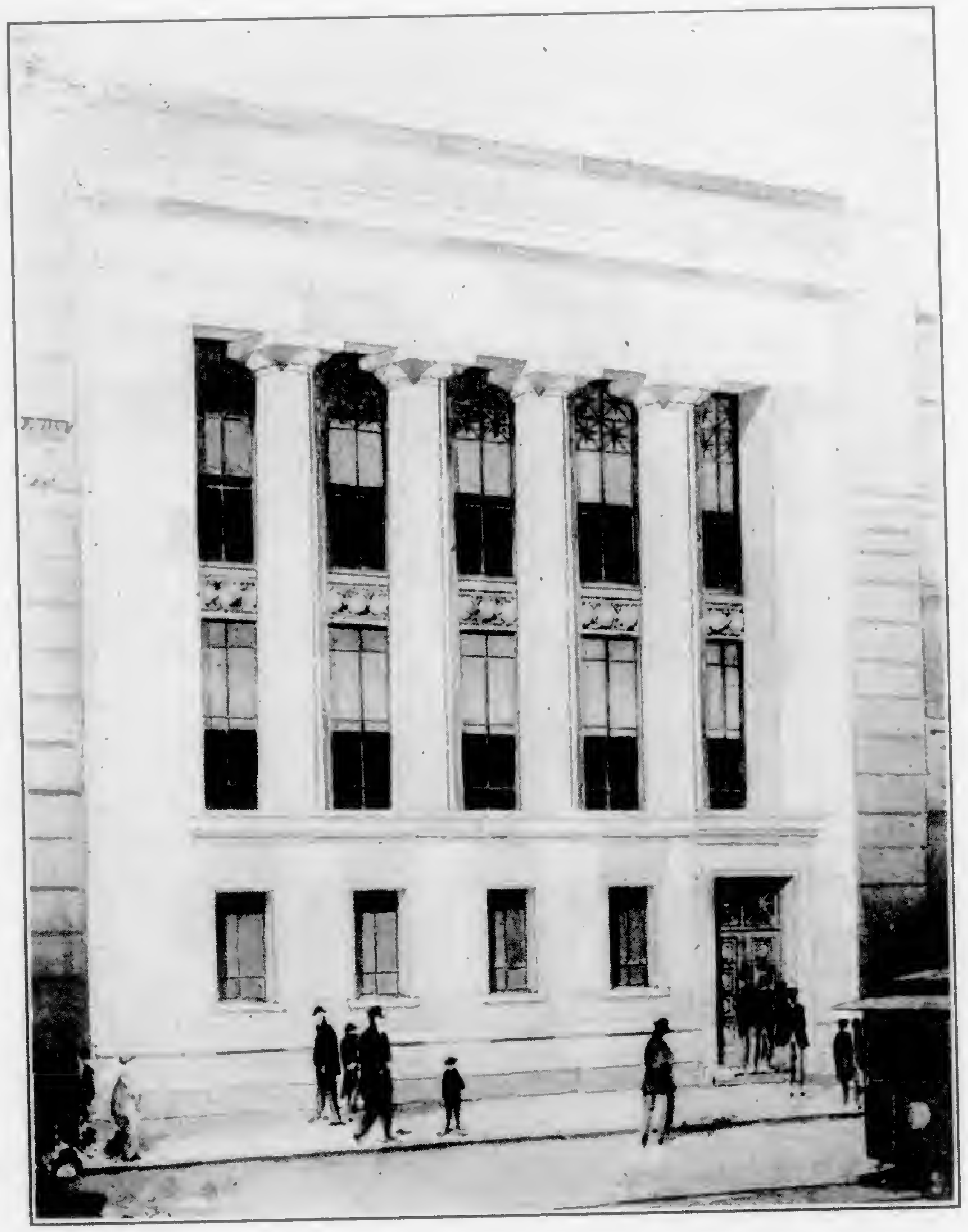
Elks' Building, San Francisco
A. A. Cantin, Architect

It may not be out of place to say that a small bird bath was made a feature of the rose garden. It was made very shallow. The rim or coping was constructed of cut limestone quartered and with liberal overhang for shadow effect. Joints were made with lead and copper bands joined the segments of the rim. The joints were left to weather and they were soon coated with verdigris, giving the desired effect.

The bottom of the bath was made of green mosaic tile with a little touch of gold in it. Detachable nozzles were fitted to the supply pipe, one to play a thin small stream above the water level, the other being attached just below the water line, lifts the water in small masses and catches it on its downfall and spreads it in ever-varying shapes.



Original Design of Stewart Building, to Occupy Site of Old Lincoln School at Fifth and Market Streets, San Francisco
Equipped with Otis Elevators *Sidney B. Newsom, Architect*



Balfour Guthrie Building, California Street, San Francisco
L. B. Dutton, Architect

The Chicago United States Government Building
F. W. Fitzpatrick, Designer

Reinforced Concrete as a Fire Resisting Material

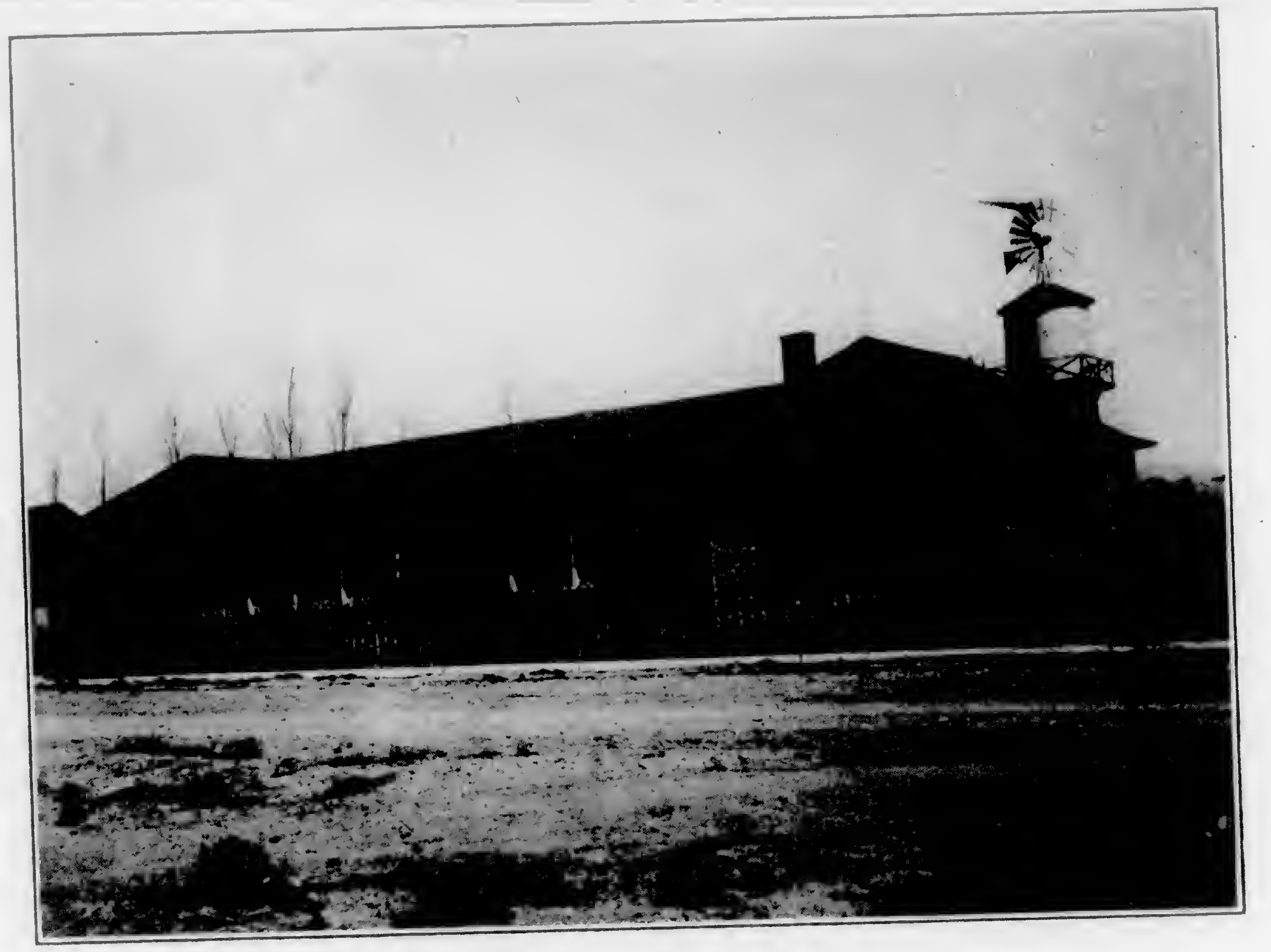
A SHORT time ago there occurred in the city of Dayton, Ohio, a fire which gave an opportunity to test the efficiency of reinforced concrete as a fireproof building material. It occurred in a factory where motor cars were made, and the main portion of the building was of mill construction and five stories and basement, adjoined by a reinforced concrete building, U-shaped in plan and six stories and basement in height. The two buildings were practically made a continuous unit, as the walls of the brick building served as the boundary of the concrete building on the open side of the U, communication being afforded between the two buildings by doors on each floor. When the fire department arrived, the fire had extended over the entire fourth floor of the concrete building. The contents of this floor were destroyed, but the building escaped with slight damage. Through the absence of fire doors and the inability of the department to withstand the intense heat and smoke, the fire was communicated through an opening to the adjoining five-story brick building and was confined to the two upper floors. It was in this building that the greatest loss was sustained.

The report of the chief of the Dayton Fire Department brings out some suggestions as to proper reinforced concrete construction, from which the following is taken:

"First: That the reinforcing steel should be covered with at least two inches of concrete, because the fire, having penetrated the lower inch of concrete, would have affected the strength of the structure had it not been for the rigidly attached diagonals.

"Second: That the finishing cement surface should be put on when the floor is being laid, thereby forming a solid mass; because the finished surface was destroyed wherever the heat was intense, the slab underneath being uninjured.

"Third: We were hampered greatly in handling our ladders and several of our firemen had a very narrow escape from being injured or possibly killed by falling sashweights, and we were compelled to force into the building all window frames that had not already fallen before we could use our ladders to advantage. I would suggest that in the construction of a building an iron pipe be imbedded in the concrete for the weights to fall into, in case the window frames are destroyed by fire."



A Bungalow in New Mexico
V. O. Wallingford, Architect

A Characteristic Southwestern Bungalow

By V. O. WALLINGFORD, Architect

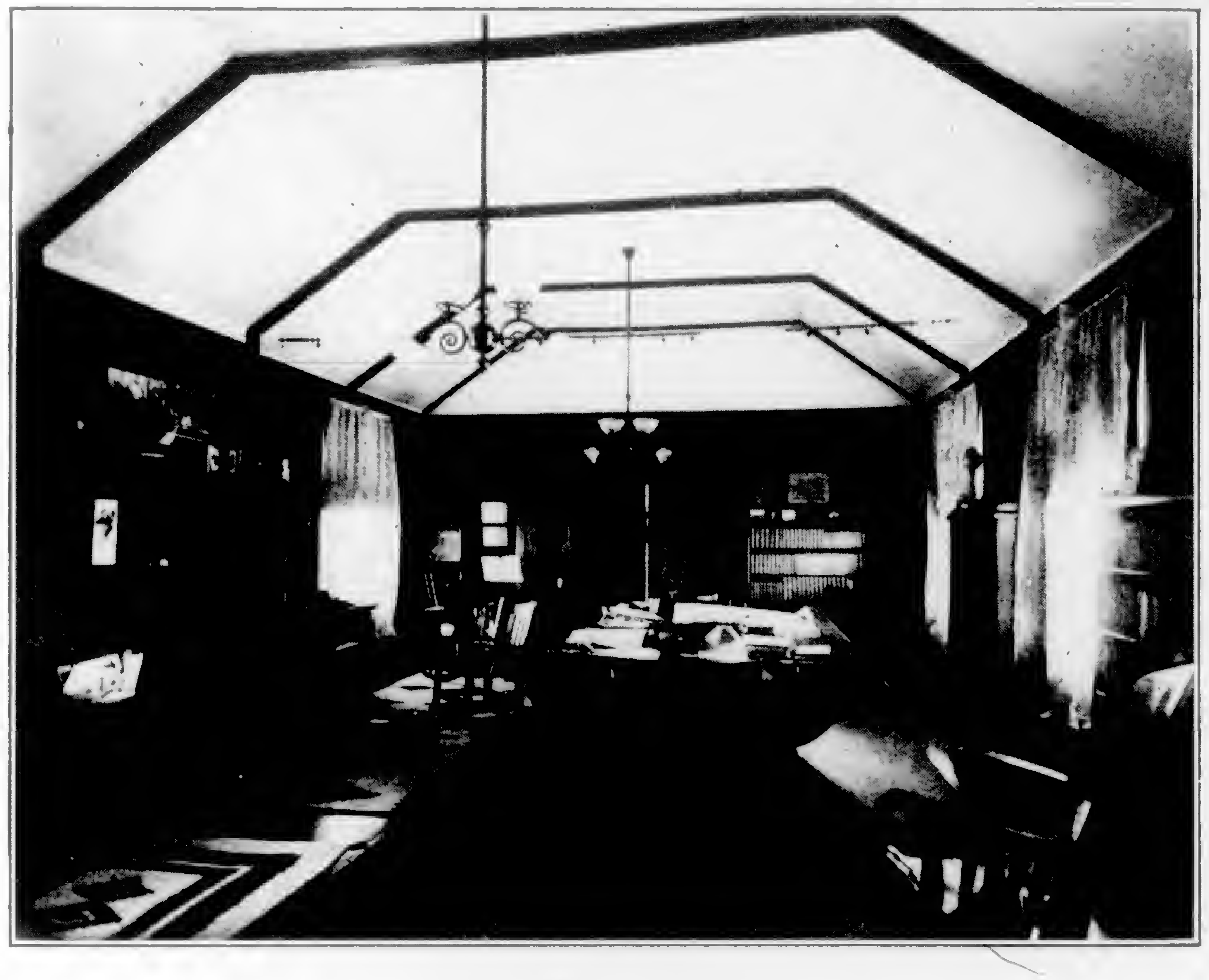
IN THE great Southwest, where the sun shines all the year, and where the sunshine and pure air are prime assets, Nature has left much to the energy or device of men. Here artifice has nearly all to do, and here, too, individuality has its widest scope with the least trammel of convention, serving first the individual needs.

Comfort is large and there is no restriction of room to develop it—out-of-doors is a big place in New Mexico, and there is no need of pushing skyward when there is plenty of space on the ground.

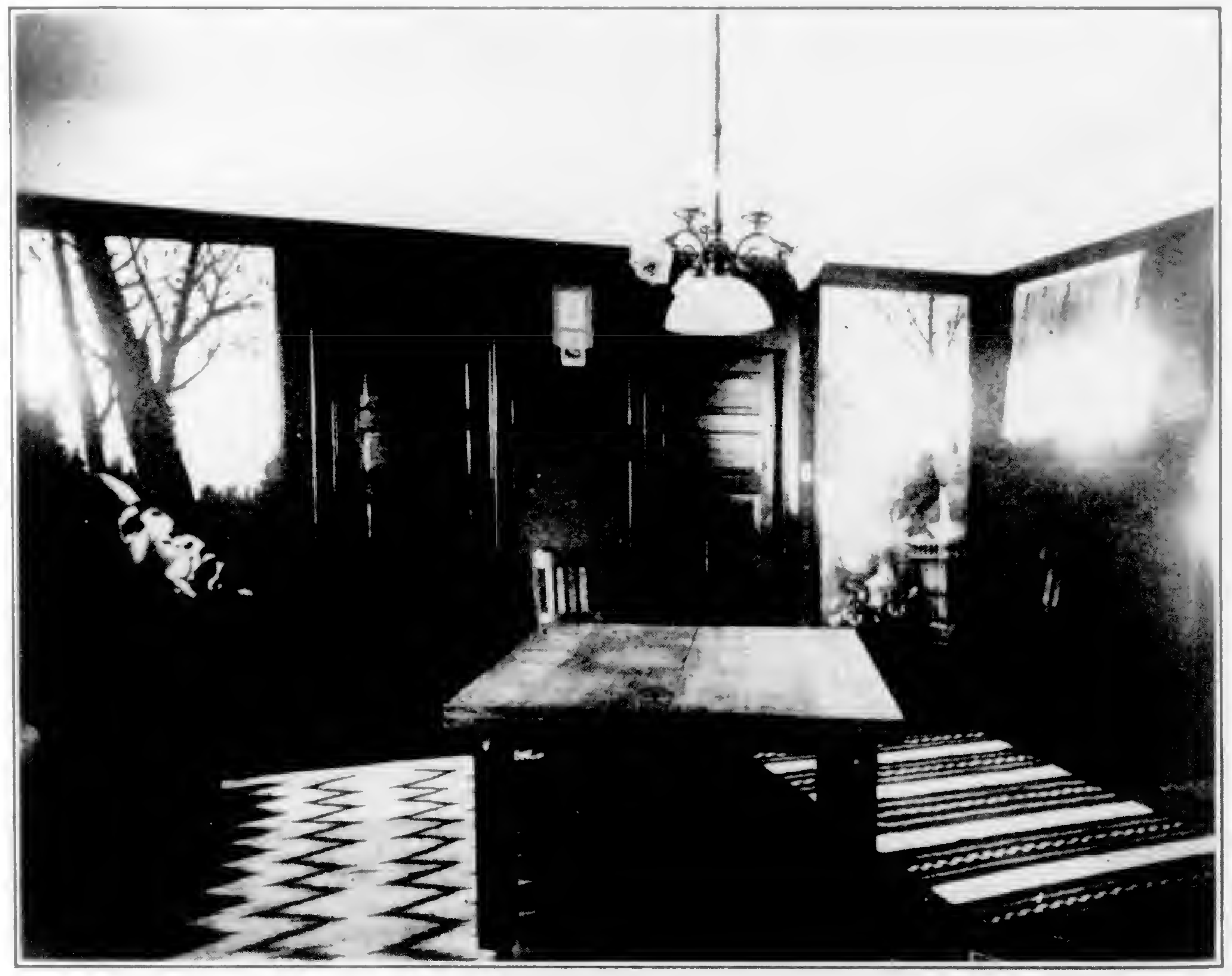
Certain needs have developed a type of residence, more or less characteristic of the country, and embodying features inherited from many local motives. There are the adobe houses, built low and massive from the nature of the material used, plastered over with mud, lime or cement to offer a smooth surface to falling rain. Crude wooden pillars with rudely carved or hewn bolsters,—heavy for supporting superimposed loads of adobe wall, crude from lack of competent tools—recalling the times of the missionary padres. Broad floor spaces not enclosed by walls, but roofed over for shade and still permitting the circulation of air, from which have developed the veranda. Wide projection of the roof timbers beyond the walls for covering the strings of peppers, dried corn or pieces of clothing hung there.

These have been gradually assimilated into the bungalow, which, though combining modern materials, still strives to preserve the traditions of its ancestry.

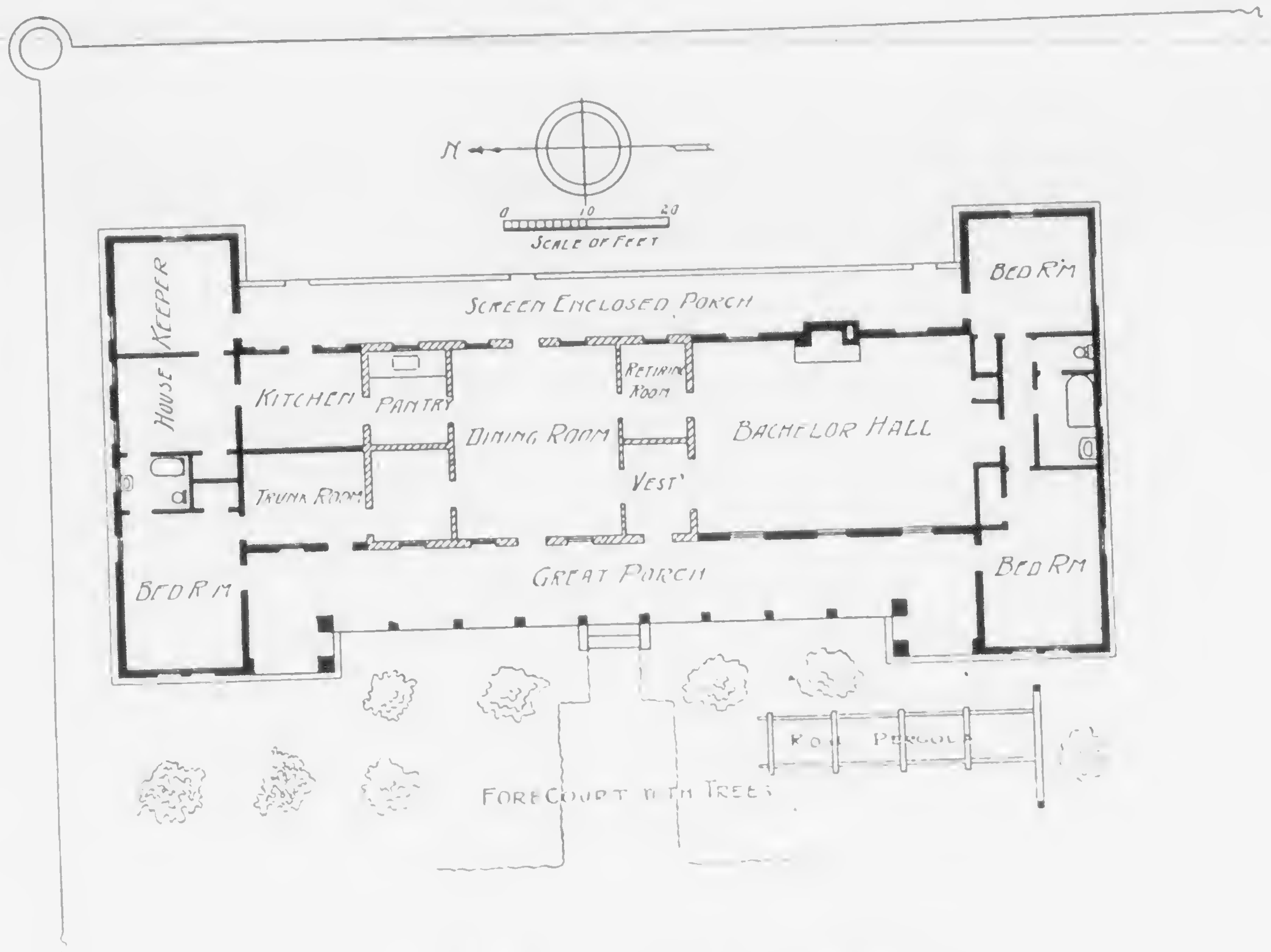
The house herewith illustrated is a development of this sort growing out of its builder's needs, the material at hand, and the circumstances of



Bachelor Hall in Bungalow
V. O. Wallingford, Architect



Dining Room in Bungalow
V. O. Wallingford, Architect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BACHELOR HALL
TRUNK ROOM
VEST'
BED R'M
GREAT PORCH
BED R'M
ROD PERGOLA
FORECOURT WITH TREES

Floor Plan of a Bungalow in New Mexico
V. O. Wallingford, Architect

its conception. There were three problems entering into the design. That part of the house shown by light shading on the drawing, which was already built, and which it was not practicable to destroy; a number of trees that it was not expedient to sacrifice; and, over all, the purpose that was to be served.

The original house grew outward at each end; the former living room became the dining room; an entrance was cut where most convenient to the interior; sleeping rooms were added where they would best serve those to occupy them; and other rooms took names from their location or purpose.

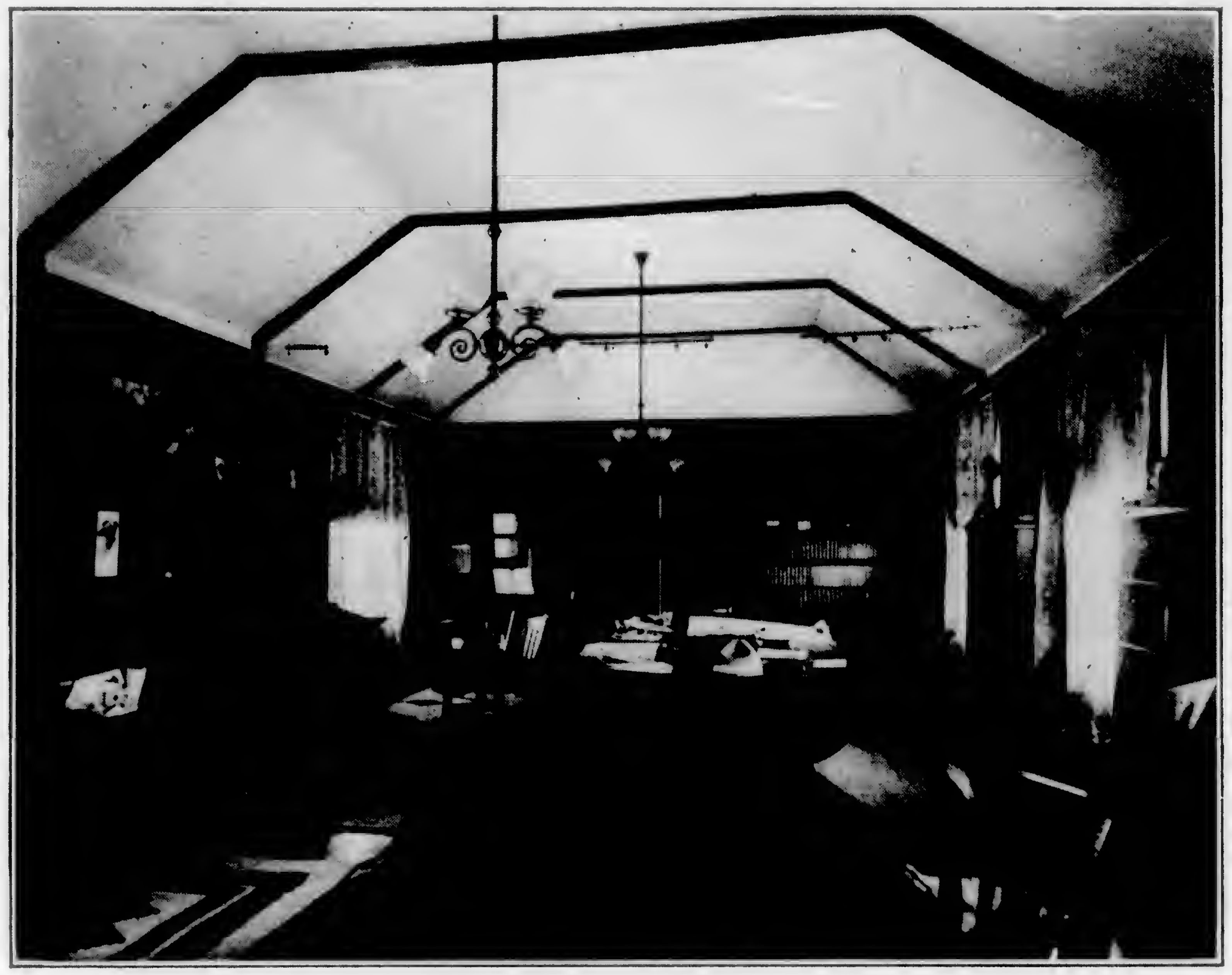
There is a basement under the south end, accommodating coal bins, boiler room, vegetable cellar and store room.

The foundation is cement stone, laid "broken ashlar," brought to the height of the window sills, and forming a continuous belt around the building.

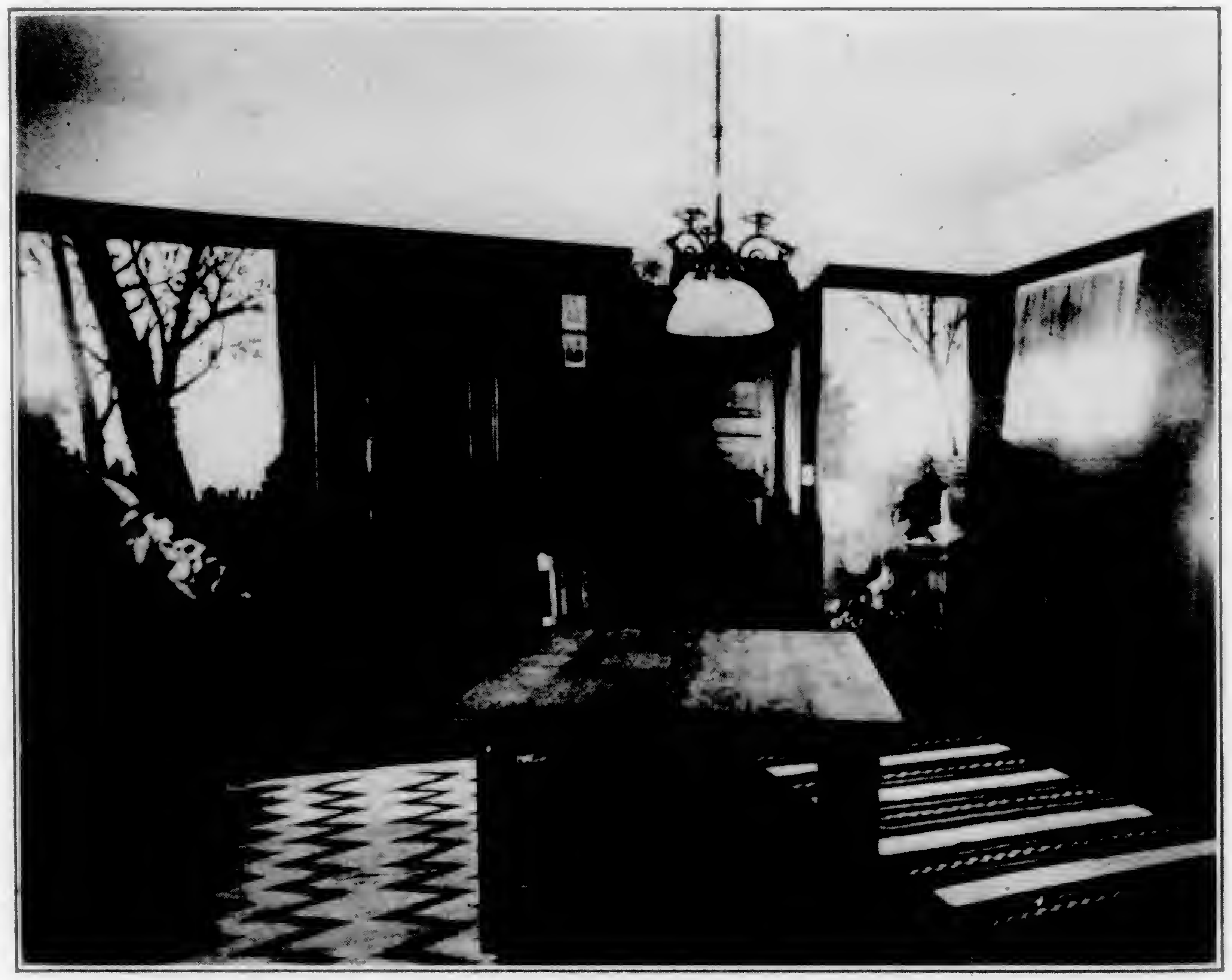
The superstructure is brick covered with "pebble-dash" cement plaster. The cement is left natural color. The roof is shingled. The interior woodwork is yellow pine, stained and finished "satin."

"Bachelor Hall" serves as a living room, library, lounging room, music room and billiard room. Care is left outside, or burned in the brick fireplace. The ceiling is formed by furring down from the roof joists and collar beams, and is paneled by built up beams.

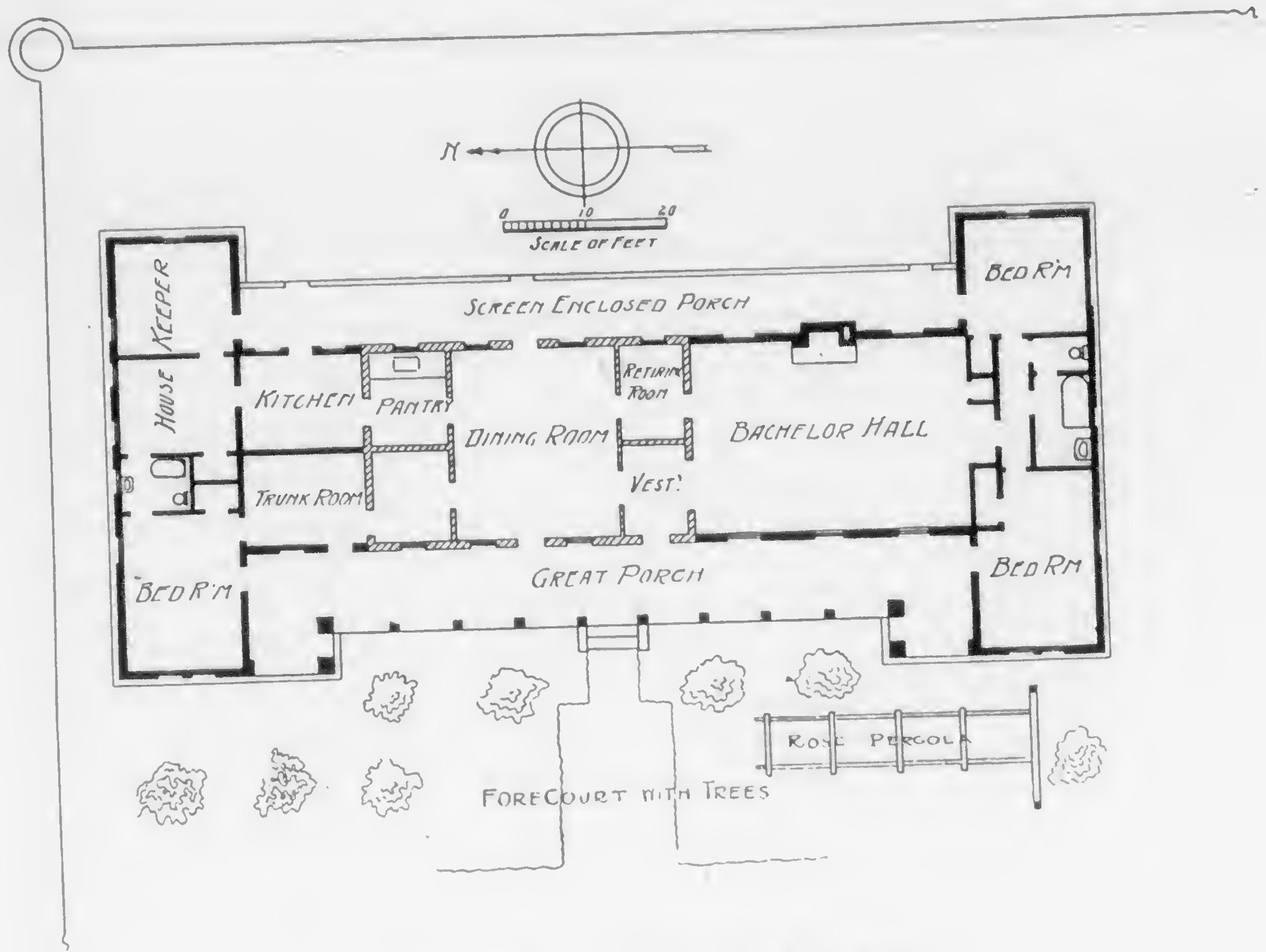
The principal dimensions of the house are 120 feet over all, by about 50 feet across the ends. The great porch is 90 feet long, enclosed by fly-screen, and vine-shaded. The house fronts west and overlooks the town of Albuquerque and the Rio Grande valley.



Bachelor Hall in Bungalow
V. O. Wallingford, Architect



Dining Room in Bungalow
V. O. Wallingford, Architect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Floor Plan of a Bungalow in New Mexico
V. O. Wallingford, Architect

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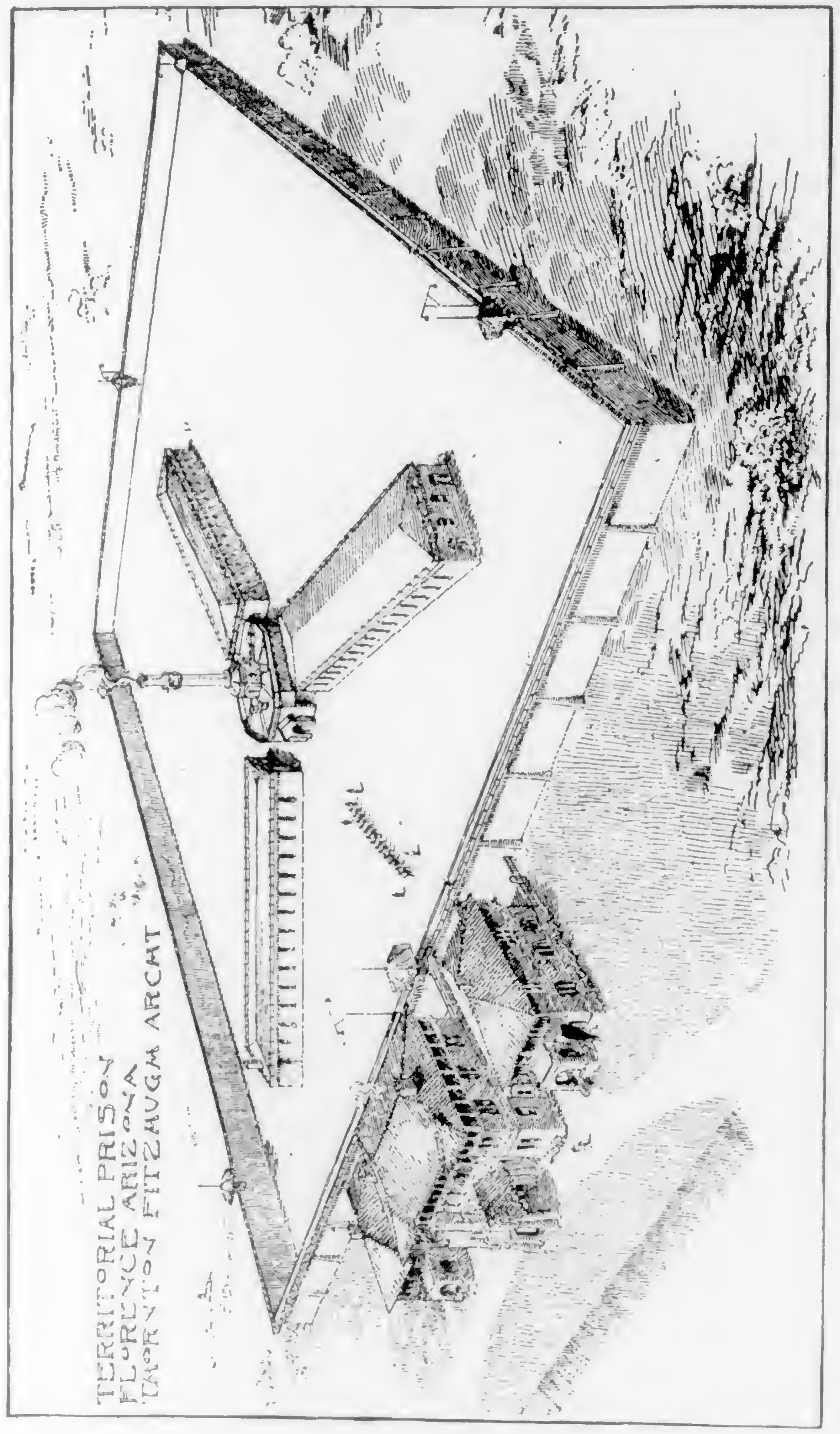

Bird's-eye View (Pen and Ink Sketch) of Territorial Prison, Florence, Arizona
Thornton Fitzhugh, Architect

Reinforced Concrete Penitentiary

CONSTRUCTION work has been started on a series of reinforced concrete buildings which are to serve as a penitentiary at Florence, Ariz. It will be a model institution of its kind, thoroughly equipped with safeguards of the most approved character for the retention of prisoners. Thornton Fitzhugh of Los Angeles is the architect.

The central octagonal building is designed for a machinery house, in which will be installed a pumping plant and equipment for refrigerating and lighting and heating the institution. Branching from it in three wings are the prison quarters, consisting of cell house, commissary and general service buildings.

A high retaining wall of concrete will enclose the entire area. A guard stationed on the roof of the machinery building may command the entire prison yard with the exception of the outer abutments of the three projecting wings. These abutments will be covered from suitably located guardhouses on the walls. Thus the entire convict area will be at all times under the control of the guards.

The administration buildings will be built just outside the prison yard, and a means of communication maintained between the administration building and the machinery house by means of a tunnel. In case of an uprising of the prisoners, a force of men can be transferred from the administration building through the tunnel to the machinery building roof, thus attaining a position which will give them control over any situation which may arise.

One of the features of the institution which is worthy of comment is the gates which are to connect the outer world with the convicts inside the walls. Apertures are left through the walls for a wagon passage and for pedestrians. There are to be gates at the outer and inner terminals of these passages, and the opening and closing of these gates is operated by special machinery, controlled by a man inside the administration building. The wagon passing through must stop between the two gates, allowing an inspection of the contents as well as preventing any possibility of escape for the prisoners. The controlling levers operate by means of ratchets working on a changeable combination.

Should a general prison delivery be planned and a trusty overpower the man in charge of the gates, it would be impossible for him to open them without finding the proper combination. Should a gatekeeper be discharged, the combination may be changed without fear that the secret of opening the gates might be disclosed to the prisoners.

The gates at the pedestrian passage open and close in the same manner. This passage is to be just large enough to admit one person and panels at the top and bottom necessitate stooping, provisions that afford the guards an opportunity to observe and count everyone passing through.

The prison quarters will be heated in winter and cooled in summer by a novel arrangement whereby warm or cool air is pumped into the apartments. The desert climate will thus be made bearable to those incarcerated.

As before stated, the buildings and walls will be constructed of reinforced concrete, the latter eighteen feet in height, nine inches in thickness at the base and three inches at the top, with reinforced walks along the top for the guards. Electric lights will be placed along the walls to afford proper light at night; sheltered spaces at intervals will be provided for the guards on duty and for concealed reinforcements. The whole area covered by the prison grounds will be about 600 feet square.

Concrete in Construction*

By G. E. ASHCROFT, C. E.

IN OUR discussion this evening we shall consider concrete from both an engineering and an architectural point of view. From the engineering side we shall consider the problems of structural design, and from the architectural side we shall consider the problems of ornamentation. Both these considerations must necessarily be very brief, since the field is so broad that in one short evening we may not expect to accomplish more than a glance at the mere fundamentals of either. You may perhaps be wondering why in an address before a body of architects the writer has chosen to say anything upon the engineering side, and his excuse for this must be that first of all the writer is himself an engineer and hence more competent to talk upon this phase of the subject, and secondly, all practicing architects would be none the worse for a grounding in the fundamentals of engineering, as all engineers are broader men for some understanding of the underlying principles of good architecture.

In the course of your practice you may never be called upon to design a reinforced concrete building, but should you ever have occasion to pass judgment upon such a design made by another, and this is a thing likely to occur, you should be able to apply those simple fundamental facts which would determine whether or not that design had been made in accordance with good current practice. So as we must first have the frame work of our structure, before we can ornament it, we shall devote the first portion of the evening to the consideration of concrete used structurally, and the latter portion to concrete used ornamentally.

Concrete for structural purposes may be composed of Portland cement, one part; sand or gravel, three parts; and clean broken stone, six parts; all being measured by loose volume, or it may be of cement, one part; sand or gravel, two parts; and stone, four parts. The latter makes a better, stronger concrete and nothing leaner than the former should be permitted in structural work, where it is to perform any other function than that of filling up vacant space. It is with this class of concrete that we shall deal in the discussions that follow.

You are doubtless all familiar with the formulae for the design of steel beams and columns, and with the underlying facts and theories upon which these formulae are based, and we will therefore take no time in the development of these, but will refer to them when occasion arises, and note in what way concrete behaves differently, when subjected to the same system of loading. In testing steel, timber and other substances, the experimenters have found that within certain limits, more or less well defined, the unit deformation of the specimen is proportionate to the unit stress applied, and the ratio of these two quantities, called the Modulus of Elasticity, is a constant. In concrete, however, it is found that this proportionality does not exist, and also that the tensile strength is only a small percentage of the comprehensive strength.

If a cube of good concrete be placed in a testing machine and subjected to compressive stress and the deformation measured for each successive increment of stress, and the observations reduced to the basis of unit stresses and unit deformations, we may show the results graphically, by plotting the values to a system of rectangular co-ordinates, in which the vertical axis represents the unit stresses and the horizontal axis represents the unit deformations. Draw a line through the various points and we shall have the curve shown in Fig. 1. A great many tests upon concrete of various grades and ages show that this curve is approximately a parabola, and upon Fig. 1 I have marked by crosses, points upon a true parabola whose vertex is the same as that of the test curve and which passes through the point zero.

Public Library, Cleveland, Ohio

Badgely & Nicklas Architects

Trimmed with Roman Stone

You will observe that the test curve varies but little from it, while if the law of proportionality of stress to deformation held true, the curve would be the straight line, shown in the figure, and marked Initial Modulus.

However, I wish to call your attention especially to the fact, that up to unit stresses of 500 to 800 pounds, the curve varies but slightly from the straight line, and hence in calling the Modulus of Elasticity a constant for these values, as does our city building laws and those of many other cities, the error is but small and is upon the side of safety.

A beam composed simply of concrete, however well made, would be of little practical use, since it would rupture under small loads, due to the small tensile strength of the material, hence the cardinal principle in placing reinforcement in such beams, is to so place the steel that it will relieve the concrete from all tensile stresses if possible, and thus aid in developing the high compressive strength of the material.

Let us consider briefly the resisting moment of such a composite beam. Fig. 2 represents a simple rectangular beam, reinforced on the tension side by four round rods, and subjected to a uniform loading. There have been many formulae advanced for computing the strength of such a beam. Some based on rational theory, some based upon results of practical tests, and some merely wild guesses.

The actual distribution of the intensities of the internal stresses no one really knows. The best formula is that one that best fits the facts as experiments demonstrate them, and as our knowledge of the material increases, the constants of the formula may be changed slightly, to suit the new facts.

The moment of resistance of such a beam may be considered to be the product found by multiplying the total stress in the steel by the distance from the center of gravity of the steel to the center of gravity of the stresses on the compression side. This distance or lever arm is shown in Fig. 2, (B) to be the expression $d(1-\frac{3}{8}x)$, in which d is the effective depth of the beam and x is a fraction of d.

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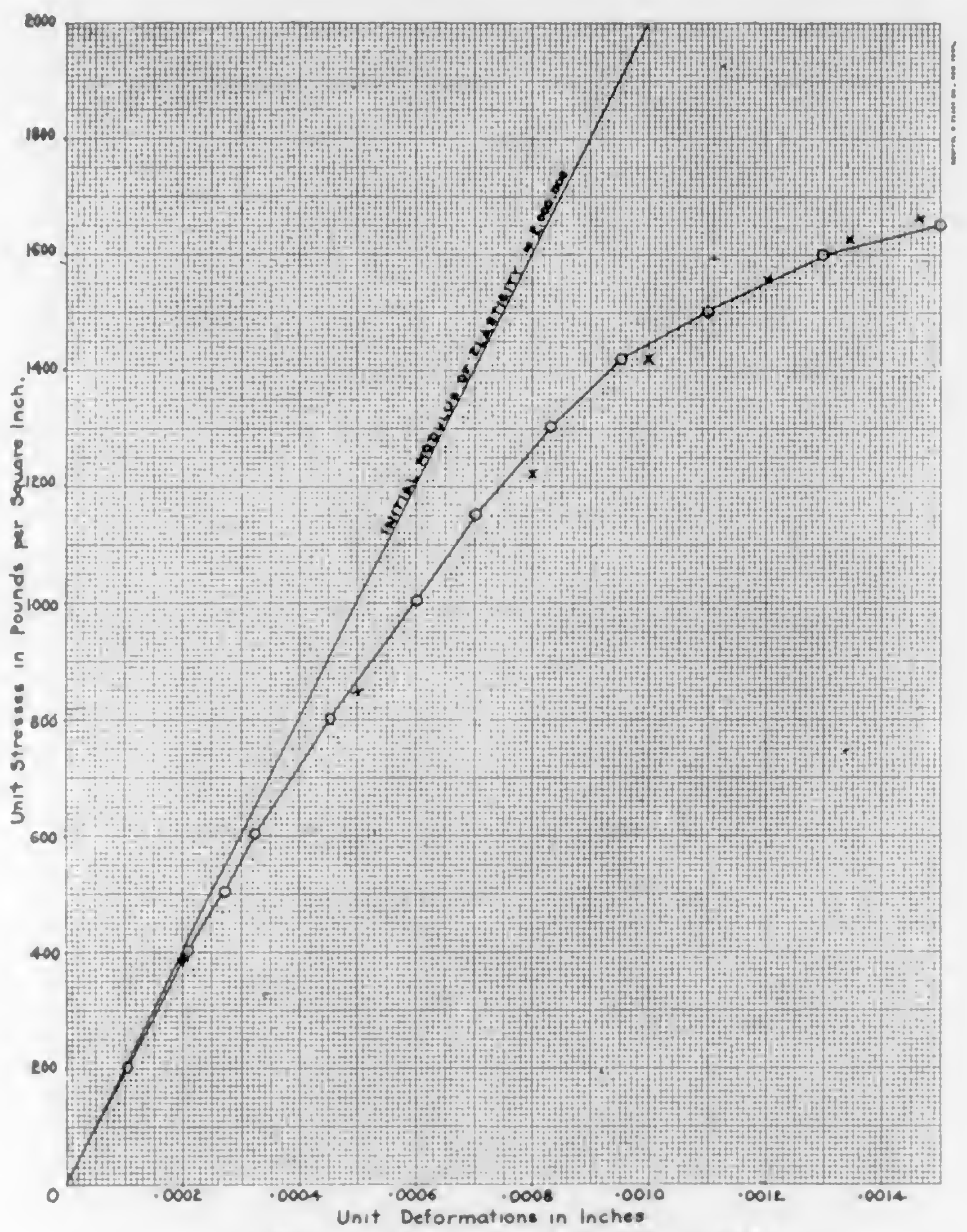
*Abstract of a paper read before the San Francisco Architectural Club, August, 1908, by G. B Ashcroft, C. E. Mr. Ashcroft is manager of the Cement Products Company, Balboa Building, San Francisco, Cal.

FIG. 1.



TYPICAL STRESS-DEFORMATION DIAGRAM
PLAIN CONCRETE IN COMPRESSION.

Thus the value of x must be determined before we can compute the resisting moment of the beam. Its value depends upon the position of the neutral axis, and may be found experimentally, or theoretically. The percentage and character of the reinforcement and the grade of the concrete are factors which largely determine the position. In theoretical studies it is common practice to neglect whatever tensile stresses there may be below the neutral axis, and consider those in the steel only, and this is again on the side of safety.

From a consideration of Fig. 2 it may be shown that the value of this quantity x is equal to the following expression, $\sqrt{3/2pe(1\times3/8pe)}-3/4pe$, in which p is the ratio of the area of the steel to the area of the concrete above the steel, and e is the ratio of the modulus of elasticity of the steel to the modulus of elasticity of the concrete. This determination of the position of the neutral axis agrees fairly well with the results of experimental tests upon such beams.

Experience teaches us that beams may fail in other ways than by the pulling in two of the reinforcing steel, as for example by shearing across a vertical plane, by tension along a diagonal plane, or by slipping of the rods through the concrete. Plain rods embedded in concrete offer a considerable resistance when an effort is made to withdraw them. This resistance, called bond, is usually measured as so many pounds per square inch of the surface of the rod in contact with the concrete. A conservative estimate of this bond stress developed would be for a plain round or square rod, 270 pounds per square inch of embedded surface. If we consider ¼ this amount as a safe working stress, and medium steel at 16,000 pounds per square inch, it may be readily shown that a plain rod in order not to slip through the concrete, should be embedded 80 d each way from the point of maximum stress, where d is the diameter of a round, or the side of a square, rod. Where large rods are used, in short spans under heavy loads, means must be taken to secure mechanical bond. This is usually accomplished by means of deformed bars, of which there are many forms in the market, and their use is to be recommended where the cost in comparison with plain bars is not unreasonable, as vibration or shock tends to weaken the bond stresses of plain rods, and may reduce it to practically nothing.

Tests show that many beams fail, by rupture of the concrete near the ends of the beam, along a plane inclined at an angle of about 45° to the long axis of the specimen, the crack beginning near the steel and gradually extending upward into the compression area until failure takes place.

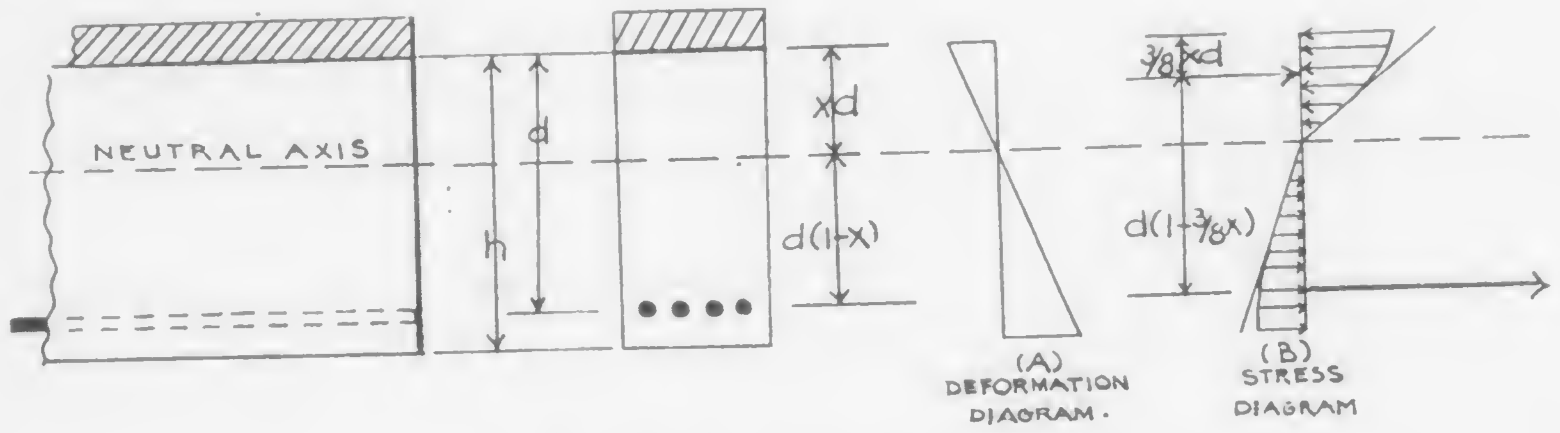
These have been commonly called shear cracks, but it is more likely that they are due to diagonal tensile stresses.

The amount of these diagonal tensile stresess is indeterminate, but it is known that when beams fail by this method the vertical shearing stresses developed are very low, and since the vertical shearing stresses may be determined, we may by this means arrive at conclusions regarding the reinforcing necessary to take care of the diagonal stresses.

The vertical shearing unit stress at any section, of a beam, such as is shown in Fig. 2. is equal to the expression $\frac{V}{bd'}$, where V is the total shear due to the external loads, b is the width of the beam, and d' is the distance from the center of gravity of steel, to center of gravity of compressive stresses, that is $d(1-3/8x)$ in Fig. 2.

To resist these stresses vertical or diagonal rods, called stirrups, are inserted in the outer portions of the beam, and should be in some manner connected securely to the horizontal rods. Where the horizontal rods are more than one in number, a portion of them may be bent upward at an angle of 45° at various distances within the third points of the span, and carried near the top surface of the beam.

FIG. 2.



REINFORCED CONCRETE BEAM.

House of Mrs. I. B. Andrews, Buffalo, N. Y.
Showing Roman Stone Trimmings
W. L. Schmolle, San Francisco, Architect

Entrance of Marine Building
San Francisco
Made of Hand Carved Roman Stone

Salfield & Kohlberg, Architects

THE ROBERT DOLLAR CO.
SAN FRANCISCO

Before concluding the structural portion of our discussion it may be well to summarize those fundamentals, by which one may judge quickly whether a beam has been well designed, or not. 1½% of medium steel having an elastic limit of 33,000 pounds per sq. in. or 1% of "high elastic limit" steel will in ordinary beams develop nearly the full compressive strength of the concrete, of such grade as we are now considering. More metal is usually a waste. 500 pounds per sq. in. is a good working standard for the allowable compressive stress upon the extreme fiber of the beam, and 16,000 pounds per sq. in. for the tensile stress in the medium steel. For such stresses the lever arm for the moment of resistance may be considered to be .83 of the distance from the top surface of the beam to the center of gravity of the steel, and the neutral axis as .45 of this distance. The amount of reinforcing when once determined upon, should be preferably in small units, evenly distributed, with sufficient space between each to permit of filling concrete, and for the sake of the bond stresses, there should be, unless deformed bars are used, a length of embedded bar not less than 160 times its diameter, or side.

When the vertical shearing stresses exceed 30 pounds per sq. in. at any section, stirrup rods should be provided to take care of the excess, or the horizontal rods should be bent upward well into the compressive area of the beam.

And while we may be splitting hairs over theories, and worrying lest we have not exactly located the position of the neutral axis, it might be well to stop for a moment and consider that the son of Italy who places the steel in the forms is not likely to have so much consideration, and that to be on the safe side perhaps it would be well to boost the factor of safety up another notch.

Long before reinforced cement concrete had found its way into the framework of buildings, cement stone had been used for the exterior of them and concrete in this form is among the oldest of the examples now existing in this country of the early use of Portland Cement. In truth, the use of concrete as a building material dates back to the time of the Romans or even remoter ages, though the cement they used was a natural product and not the highly efficient Portland such as we know today. However desirable a concrete framework may be from the point of durability and high fire resisting qualities, and few there are these days who deny it, there is no denying the fact that ordinary structural concrete, as an exterior and visible finish is ugly past all endurance, which no beauty of line or symmetry of form can cause us to forget.

I believe in time we shall see a concrete architecture. That is, buildings of concrete will be frankly treated as such and no attempt made to conceal the fact by false joints and intricate masonry details. When that time comes we shall content ourselves with simple outlines, bold details and surface treatment as may be. But that time is not yet and the problem has been to make a concrete suitable for exterior finish. The plastering of an inch or so of richer mortar over the exterior of the building and running false joints through the mass to imitate stone work is a practice that can not appeal to any one. It is a sorry makeshift and furthermore only in favorable climatic localities will such a coating remain in any good condition for any considerable length of time. Better far than this is the practice of using selected aggregates, and either bushhammering the surface or removing the dead looking film of cement by means of acid washes. And the better practice still and one that will appeal to the logical mind as being wholly consistent, is to perfect a suitable concrete stone, that may be used as a facing for structural concrete or for steel work as well.

It is a wholly illogical process that employs concrete for the frame work of a structure because it is fireproof and durable and then faces the exterior of the same building with a natural sandstone or granite, either of which there is all too much evidence, is among the poorest fire resistants that we have.

The development of the process of making cement or concrete stone, until the last half dozen years has run along on very much the same lines, a mixture of sand and cement tamped or pressed into an iron or wooden form. The development has been principally in the perfecting of the machines while the product has remained largely the same. Cement stone made under these conditions exhibits several marked peculiarities. In order to empty the forms quickly, so that a second filling may be made, the mixture of sand and cement is made very dry, just enough water being added to make the mass cohere slightly. There appears to be no help for this, though the water used is not more than 50% what it should be, for a proper crystallization of the cement. Subsequent sprinkling of the stone must be resorted to, but the outcome is that under most practical conditions, the damage done the product due to this lack of the necessary amount of water in the early stages of hardening, is never wholly repaired by the subsequent sprinklings.

The machine product is porous, weighs from 95 to 100 pounds per cubic foot, and has an absorption at times as high as 25%. Unless an adulterant color is added, the blocks are the dull grey of the cement, the most unattractive of colors when seen in a structure. When color is added it is a rather difficult matter to secure a uniform distribution of it throughout the mass. White Portland cements have been placed upon the market from time to time, but their increased cost has rendered them prohibitive.

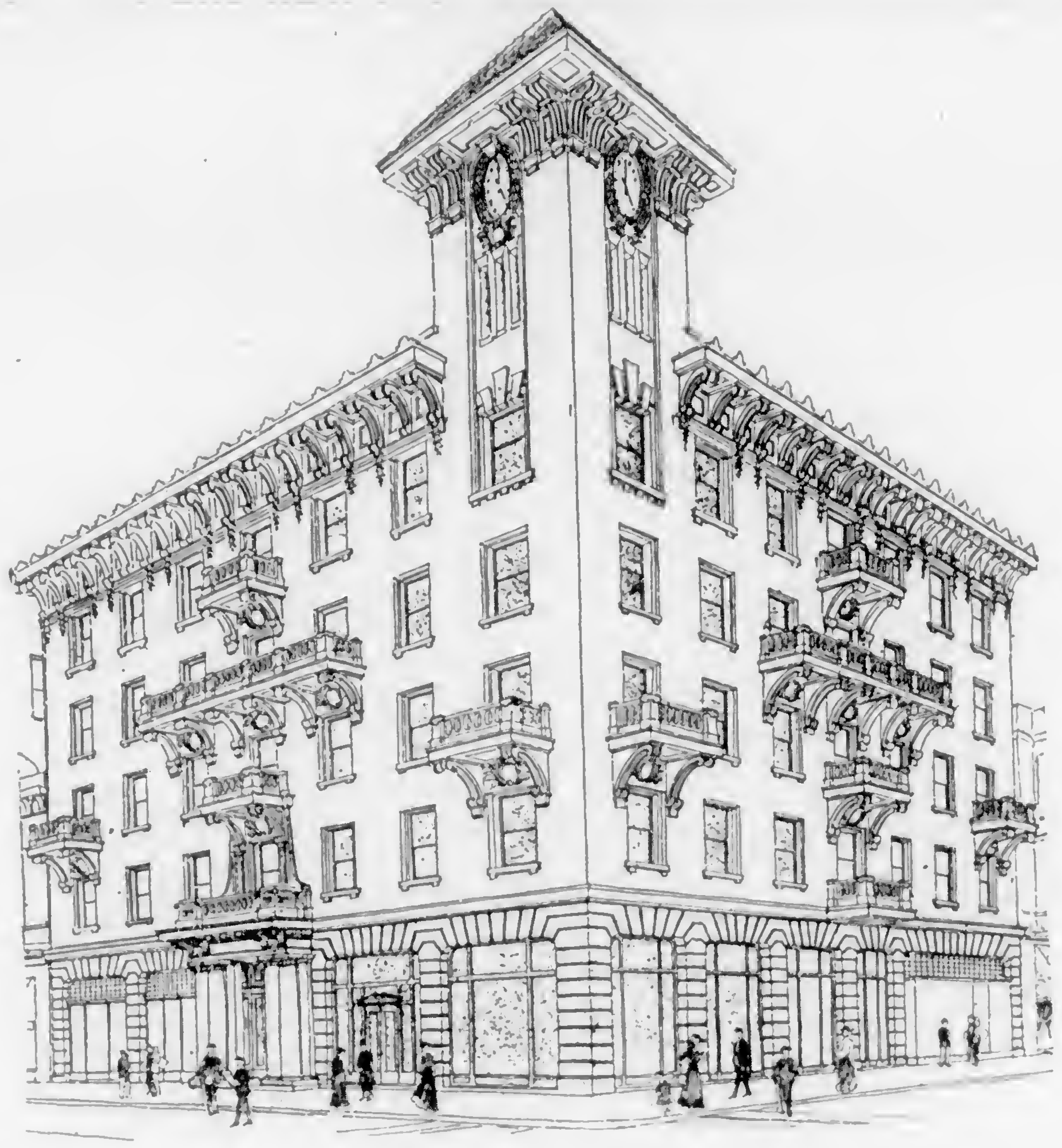
To overcome the matter of excessive absorption, resort is had to the practice of placing a richer mixture upon the exterior of the block.

This facing then contains the color. If the climatic conditions are any but the most favorable, this facing is quite likely to crack, owing to a differential rate of expansion between the two mixtures employed.

The use of machines precludes the possibility of very much variation in form or size of the product and this dull uniformity has mitigated perhaps more than any other one thing against their use in any but the smaller or less important structures.

That a proper cement architecture may develop with the ever increasing use of cement, the architect must be free to design whatsoever he will, confident that the manufacturer can gratify his every wish.

In contra distinction to this dry or tamped process just mentioned there has been in course of development for the past ten years a process of making concrete stone, that bids fair to meet all the demands that a growing concrete architecture will make upon it. This process has grown up around the fundamental patents of Chas. W. Stevens, which were briefly the casting of a liquid concrete into a sand or other absorbent mold. The product of this process has been variously termed, "Litholite," "Egyptian Stone," "Roman Stone," etc., by the companies using the process, who by experiment and experience have added to the common knowledge until there is little doubt that the Stevens cast concrete stone of today, is the most acceptable of all such, for the exterior facing of buildings. This process differs radically from that first mentioned, the "dry process." The aggregate is a selected rock, crushed and screened to several sizes, to which the cement is added in correct proportion and the whole mass turned up in a mechanical mixer, after enough water has been added to make the mass thoroughly plastic or semi-liquid. From a wooden pattern, molds have been made in sand. Into these molds the liquid concrete is poured, somewhat in the manner of making iron castings. At once the excess moisture in the mix drains away into the sand, thus forming a damp covering that protects the stone from all atmospheric effects, while the hardening of the cement is in progress. Several days later the stone is lifted and the sand which still clings to its surface is brushed away.



Bank of San Jose Building

Henry A. Schulze Architect

Herring-Hall-Marvin Safe Vaults Used Throughout Equipped with Van Emon Elevators

This stone is dense, weighing over 140 pounds per cubic foot, uniform in color and texture throughout, requiring no facing, so that a block may be cut or carved in any manner similar to natural stone. The color is very light, comparing most favorably with Indiana limestones.

It is a remarkable fact that stone made by this process, in which no tamping or pressure is used, is 40% heavier than stone made by the dry process, even though hydraulic presses are employed. When tooled by machinery after the casts are a few days old, the resulting product has all the life and beauty of a natural stone, but combining therewith all the well-known advantageous qualities of concrete. It is the great flexibility of this process when applied to various designs that has been one of the greatest factors in the promotion of its growth. No set form or size of patterns are employed, but from your details, the manufacturer will prepare a wooden pattern, and with it, molds in sand for as many stones as may be required, be it only one or several hundred. This takes the making of concrete away from the haphazard methods of the street, and places it in an organized factory, where the process is reduced to mechanical routine, under constant and competent supervision, and where the uniformity of the product is an assured fact. If the Stevens process did nothing more than this, it would have been a notable advance toward the attainment of that object for which we are all striving, you as architects and designers, we as manufacturers and contractors, the realization of a new architecture, that shall be a concrete architecture employing only the ideal concrete.

Terra Cotta Houses Replace Wood

GOVERNMENT experts have covered the country with their investigations, and they report that the time is not far off when the country's timber will be gone. This means that other things must be found to take the place of wood. The United States government has established laboratories at various centers for the purpose of testing all sorts of structural materials. The results of these tests are published from time to time, and in this way engineers, architects, and contractors are informed as to the capabilities of the materials.

Only within the last year or two has general interest in the diminishing timber supply been aroused. The recent conference of governors, called by President Roosevelt, was due chiefly to the report of the official forester, Gifford Pinchot, to the president. To the condition which made the conference necessary may be traced also the invention of novel building materials.

Thus there is a constant attempt to employ for building the only substance of which the supply is unlimited, the soil of the earth itself. Especially is this so in and near the big cities, where the scarcity of timber and the consequent high prices are felt most seriously. For here the difference in price between a frame house and a house of more solid material is so small as to be unimportant.

Illustrative of the general tendency to find substitutes for wood is the suggestion of Herbert M. Wilson, of the United States Geological Survey, that scientific investigations into the properties of clay be undertaken. The American Ceramic Society made a start in this direction by appointing a special committee to report upon a plan "for systematizing the study of clay products."

Individual builders meanwhile have gone ahead and demonstrated the practicability of their ideas. Last year the building departments of New York City, for the first time in its history, received plans for a terra cotta house. The plans were passed upon favorably, and the house, which belongs to a professor in New York university, has just been completed.

In the suburbs around New York, there have been put up recently several terra cotta dwellings. The principal element in them is the hollow tile block—the same kind of block that is used for fireproofing the "skyscrapers" on Manhattan Island. It is manufactured from New Jersey clay, and in the process of manufacture is subjected to a heat of 2200 degrees.

In the walls and partitions the blocks are set end on end, so that the hollow spaces form continuous perpendicular pipes. These hollow spaces make the walls non-conductors of heat, and thus tend to keep the house warm in winter and cool in summer. In the floors the blocks are laid between beams of steel or reinforced concrete. With both walls and floors made of terra cotta each room is inclosed with fireproof material, and fire could not easily spread from one room to another.

The second man who submitted to the New York building department plans for a terra cotta house was Amos L. Schaeffer, engineer of the public service commission. Instead of letting the job to a contractor Mr. Schaeffer employed laborers and himself oversaw the construction of the walls and floors. By this he saved money, the frame costing him anly $2500. Once the frame of hollow bricks is built the cost of a house depends mostly upon the "frills"—the interior finish, trimmings, decorations, etc.

The exterior surface of a house of this type is covered with a stucco of whatever color the owner chooses. The original cost of a terra cotta house is perhaps 10 per cent greater than that of a frame building of similar size. The ultimate saving is effected through smaller maintenance charges and insurance premiums.

Some architects have made a specialty of fireproof dwelling-houses, planning homes that cost anywhere from $5000 to $40,000. Only last year two handsome terra cotta residences were built at Englewood and Mount Kisco, suburbs of New York, at a cost of about $40,000 each. At almost the same time a terra cotta "cottage" with nine rooms was put up at Briarcliff, another suburb, for $6500.

Since the introduction of automobiles the safe storage of large quantities of gasoline has become a problem for the builder. Wood is of no value here. In the big cities the law requires the building where gasoline is kept to have none but fireproof materials in them. Accordingly many of them are being made of clay products throughout. An instance is the tile garage built recently by Dave Hennen Morris, former president of the Automobile Association of America. Other owners of private and public garages have followed his example.

Perhaps the most significant single effort toward the substitution of other materials for wood is the proposal to extend the fire limits of New York to include the whole greater city. If the aldermen pass such an ordinance it will mean that no more frame houses of any kind may be built in the metropolis. Ten years ago this plan would have had no chance of success; now it has a good chance, simply because the high price of lumber has made the cost of a fireproof house relatively small, and has, therefore, removed or weakened the desire of builders to use wood.

* * *

A New Use for Concrete

REPAIRING breaks in the hull of a sunken steamer with concrete, says the Iron Age, is a new departure, but one likely to prove frequently useful. The scheme was successfully tried upon the steamer George W. Elder, which was sunk in the Columbia river over two years ago, and remained under water many months. The boat struck on a jagged rock, which stove several holes in her iron hull; the principal one, about eighty feet from the bow, measured about thirty-five feet in each direction. Through this enormous gap the rock projected into the hold for nearly eleven feet. A bulkhead was built by divers, forward on the break, and another aft, and two more aft of the engine room. Heavy canvas was then placed over the rock, which projected up into the ship, and concrete was placed over the canvas until a heavy covering had been obtained. This was supported against the outside water pressure by a concrete beam athwart the hold, measuring 18x48 inches and thirty-eight feet long. The concrete was mixed and placed under water by divers, the cement being sent down a chute in sacks and the stone in a box.

Other smaller breaks having been similarly treated, the water was pumped out of the hold, and the vessel floated and towed forty miles to a dry dock. One of the problems connected with concluding the operations involved the relation between the capacity of the pumps, which were discharging water from the hold, and the flow through leaks developing around the huge cement cone, and at other points in the hull which had been severely strained by the action of the current during the sixteen months of submersion. By the terms of the contract under which the salvage operations were undertaken the successful wreckers received $30,000, as against nothing in case of failure. The original owners had sold the wreck for $10,400, and, as the cost of repairs was about $20,000, the outlay of the buyer amounted to about $60,000. After the ship was ready again for service an offer of $160,000 was made for her.

The Inspection of Structural Steel*

By P. S. HILDRETH.

LIKE many other branches of professional work, the supervision of manufacture of iron and steel work has become a specialty, and is best accomplished by the employment of reputable and experienced inspecting engineers. To judge of the value of the services of such specialists, they should be weighed in the same scales as other experts: experience, judged from years and variety of work; facilities, by the number and location of assistants; methods, by the character of records furnished, and reputation, by the class of work done and references. Least of all is the charge for services. The value is dependent largely upon the conscience and thoroughness of principal and assistants, and is not a commercial product to be bought from the lowest bidder; in fact, low terms can mean nothing else than poor service. Terms, by custom, are made per ton, and there is a proper variation in cost of inspection of a light, complicated structure, or a heavy, straight one. They may properly vary from $1.00 to 70 cents per ton for mill and shop inspection, and from $150 per month to 25 cents per ton for inspection of erection when desired.

Inspection of the manufacture of iron or steel work is not a part of an architect's services, particularly as it is of marked value to both the general and the steel contractor in the information it furnishes the former and the delay and expense it saves to both. It is therefore customary for leading architects to specify that the general contractor shall employ inspecting engineers, but as he may defer to the steel contractor, and it is important that they should be absolutely independent, a clause about as follows is generally used:

"The material of all members under calculated stress shall be tested and all materials and workmanship shall be inspected at the original points of manufacture by inspecting engineers appointed by the architect, and subject to his removal. The cost of such inspection shall be paid by the general contractor at the rate of —— cents per ton of structural iron and steel required for the building. The inspectors shall represent and report to the architect and general contractor with the view of securing the prompt and orderly delivery of members of material and workmanship specified."

In addition to this clause there should be others requiring the steel contractors to furnish proper facilities for testing and inspection, without charge, and to promptly replace rejected material or workmanship; also, that such inspection or lack of inspection shall not relieve the contractor from responsibility under the contract and specifications.

The details of good inspection of structural steel during manufacture are stated below, and are supplemented with a few examples of the value of such inspection.

As a general principle, it is essential that the manufacture of cast-iron and steel and the fabrication of steel shapes in the shops should be supervised during their entire progress, rather than merely passed upon after portions of the work are completed. It is only by such supervision that errors and defects can be prevented, the general character of workmanship improved and delays necessary to make corrections avoided. Some defects, if not discovered until work is finished, can never be entirely satisfactorily corrected unless the entire member is rejected and replaced, which is often impracticable. When inspection is intelligently conducted on these lines it is welcomed by the best manufacturers, and is of assistance to them in promptly and properly getting out their work.

During the rolling of steel at the mills or casting of iron at the foundries, inspectors should be present and have knowledge of the stock used. They should personally choose representative test specimens and personally make the tests, in order to be able to testify in court if necessary. They should see that chemical analyses are the specified determination and personally take drillings for check analyses when desirable. As the material is cut, straightened and handled for loading, they should inspect it for accuracy of section, weight and all classes of physical and surface defects. Particular attention should be given to castings by sounding, striking edges and examination. They should report as to the tonnage of material cast or rolled and shipped, and send a list of the material accepted and rejected with corresponding detailed records of tests identified as applying to certain material. The bending test is best reported by an outline of the actual bend. Every piece of material should be accounted for. They should also report as to the prospects of securing material, and advise purchasers as to when material may be expected from the foundries or mills, and expose the falsity of statements frequently made by shops that they cannot secure material when such statements are untrue.

During shop manufacture, inspectors should be familiar with the plans and check them for clearance and compliance of shop-working plans with general plans as to main sections. They should supervise the shop work from its start, carefully watching the material for mechanical defects, particularly during punching and other manipulations, assembling of members, including preliminary comparisons with plans, matching of holes, painting of surfaces in contact and surfaces inaccessible after erection (two coats), straightness of members, riveting, facing, boring and finishing. After members are finished, and before painting is done, they should make a careful final inspection and detailed comparison with plans. They should finally see that members have all scale and rust removed and are thoroughly painted with specified paint on dry surface, are correctly marked, and are so loaded upon cars as to prevent injury during transportation. They should report weekly as to the progress of the work in the shops, showing in detail the number of pieces required, those being manufactured and those shipped. In special cases they should report the progress of manufacture and shipments daily by wire.

When work is let at a pound price, and when required, the inspecting engineers should estimate the weights of members and in all cases inspectors should watch the scale weighing, and when weights are estimated, make a comparison of each member with its estimated weight.

When inspection is finished there should be rendered a complete final report giving a brief history of the work and describing the inspection. It should include the records of all material inspected, with the corresponding tests, rejections, variations from specifications, errors, methods of correction, statement of weights and dates of shipment, and other matters of interest, and should be a convincing certificate of the character of materials and workmanship, and all records should be original papers signed by the inspector in charge, rather than copies, in order that, if necessary, such records may become competent evidence in court, and under any circumstances will demonstrate to the architect and owner the actual performance

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* Reprinted from the "California Journal of Technology" for August, 1908.

of the work rather than the making up of results in a general office or the copying of mill or shop records.

On important contracts the individual men on the work should be known to the architect and subject to his discipline or discharge. All reports sould be rendered to the architect, with copies to the contractor and copy of final report for the owner. In general the inspection should be absolutely thorough, honest and complete. There is no man but makes mistakes, and commercial conditions of manufacture and the best methods of testing do not give absolute assurance; nevertheless, honest and competent inspection is of established value.

* * *

Exquisite Work In Italian Marble

By AMY LYMAN PHILLIPS, Hotel Plaza, New York

ANY person who cares for marbles may find in a visit to the Hotel Plaza in New York, enough to interest him for some time; for this beautiful new hotel in French Renaissance style of architecture, has apparently been built and fitted regardless of expense, and in the public rooms especially, some of the most exquisite Italian marble in America is to be found.

The rotunda is finished in Italian marble and the superb panels of peacock marble have no equals. In the tea room, there are four antique caryatides representing the four seasons, imported copies of Roman antiques. In the Fifty-ninth-street lobby, the pilasters are of starzema marble, the panels of Pavanazzo and light-veined Italian. The various panels are bordered with starzema and white Italian marble, ranging in color from white to the exquisite Fleur de Peche or peach bloom color.

The columns in the tea room are also of Fleur de Peche on bases of Breche Violette marble.

In the café overlooking the park, the pilasters around the room and the doorways are of Caen stone, beautifully carved and in contrast to the panels of fumed oak.

At either end of the main corridor, connecting the Fifty-eighth street dining room with the men's café, are circular marble staircases, under one of which is the marble-lined "bureau" of the Maitre d' Hotel. These staircases are marvels of beauty and the same effect of marble panels is used as in the foyer.

On the second floor there is exquisite marble wainscoting in the corridor which leads from the ball-room to the banquet hall, and another marble staircase leads from the ball-room down past the mezzanine floor to the private entrance to the ball-room.

Many of the panels are matched in the centre, and the delicate veining of the marble is identical on both sides, so as to form a pattern from Nature's workshop that puts to shame any devised by the craftsman. The caryatides in the tea room are worth special inspection, the originals having been done by the famous pupil of Michael Angelo, Donato Donati, without models. The methods of Michael Angelo for the illustrious Pisani family at Carrara were adopted by his pupil and the heirs of the Pisanis sold the originals to the municipality of Carrara sixty years ago.

* * *

A Social Blunder

"Why did Binks' widow feel so indignant at his funeral?"

"The members of his volunteer hose company sent him a floral fire extinguisher."—Judge.

Durability of Cement and Concrete in Sewers

THE question of the durability of concrete sewers has been raised first by those who have an interest in the use of other materials and second by such occurrences as that reported from Great Falls, Mont., and is the subject of much study, observation and experiment. It cannot be said that the question is settled or that it can be easily settled.

The ordinary use of cement pipe for carrying sewage has continued for many years and there are now many miles of concrete and reinforced concrete sewers in existence as well as of plain and reinforced concrete pipe sewers. There have been some failures of cement pipe sewers, but the circumstances surrounding them do not seem to have cast any doubt upon their suitability for carrying sewage, the quality of the materials or of the workmanship used in making the pipe being the cause of the failure. There are on record occasional instances of the destruction of concrete by discharge of waste from chemical works, and probably cement pipe sewers carrying such discharge would be affected thereby. The same would be true of the cement used in laying brick or in jointing vitrified pipe sewers, and to a certain extent of those materials also. In the Great Falls case referred to the investigators are fully satisfied that the sewage has no effect upon the cement.

Stale sewage, undergoing putrefaction in a tank, may have a deteriorating effect on concrete which would not be observed in a sewer where the flow of sewage is continuous and the sewage is comparatively fresh. Thus Mr. W. S. MacHarg and Mr. W. S. Shields, of Chicago, report that concrete septic tanks four or five years old have deteriorated very seriously. Neither of these engineers seems to be prepared to attribute the deterioration unquestionably to the action of the septic sewage upon the concrete, and both are making observations upon the conditions in other tanks and in concrete outfall sewers therefrom to determine if possible the cause of the deterioration and the extent of the action in case it can be attributed to the sewage.

In the Great Falls case Mr. E. T. Tannatt and Mr. Edmund Burke, of the Montana Agricultural College Experiment Station, found serious deterioration of concrete sewers and of cement mortar and joints, and also of bricks in brick sewers. Their conclusions are in brief that the deterioration in the brick was due to softness of the brick; that the deterioration in the Portland cement used in the mortar for the brickwork, as well as in the concrete sewer, was due to the alkali in the soil, which was carried into the mortar or concrete by the ground water. This action seemed to be independent of the height of the sewage in the sewer and to be strongest at an elevation above that of the sewage but below that of the ground water.

J. Y. Jewett, of the U. S. Reclamation Service, reports, in a paper before the American Society for Testing Materials, that he has observed deterioration of concrete structures at about the soil line in alkali soils and that this action is similar to that of sea water upon concrete. If this latter suggestion is shown to be correct, it should be possible, by selecting the cement, carefully, to find one which will be safe for use under such conditions. Puzzolan and some brands of natural hydraulic cements may prove the proper materials to use, rather than Portland cement.

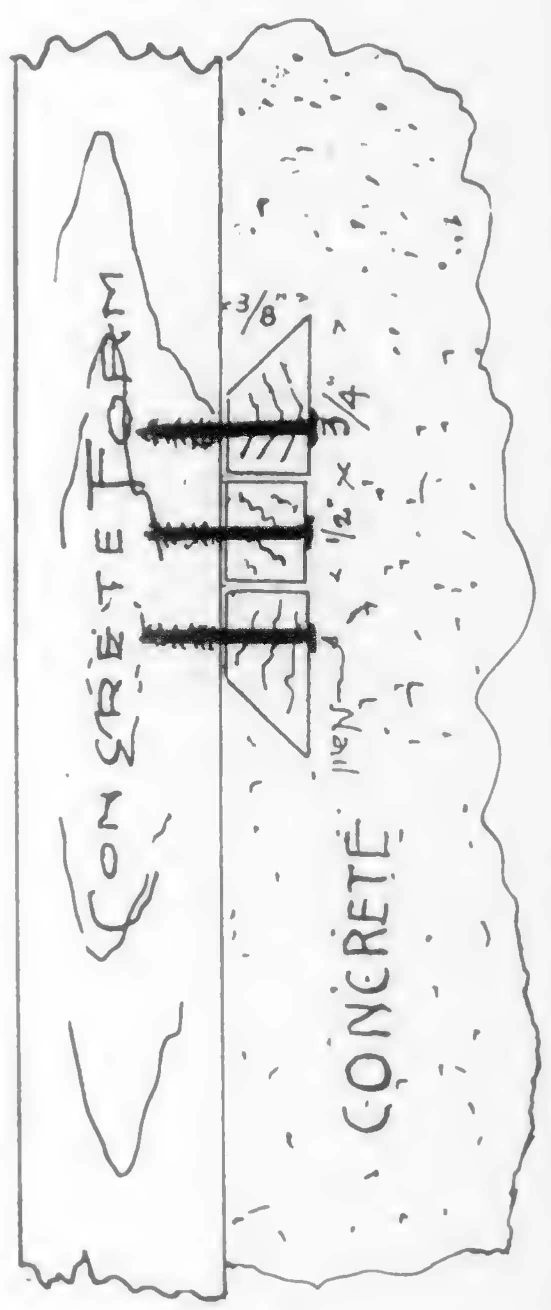
A cement water pipe 18 years old, in southern California, is reported to be quite seriously clogged by the collection of gravel and lime on mortar projecting from the joints, which hardened and continued to increase the deposits. There is no definiteness about this report, but its indications, so far as they go, are that the composition of the alkali in the soil is the determining factor as to whether the cement pipe will deteriorate or the reverse.—Domestic Engineering.

New Process for Veneering Building Fronts, and Light Courts.

By W. W. FUNGE, JR.*

THE recently completed "brick-tile" veneering of the Whitney building in San Francisco has been very favorably commented upon by Pacific Coast architects and builders.

Fig. 1



This building is constructed of reinforced concrete and a somewhat original method of making a dovetail mortise in the concrete was employed. In setting up the forms, three small strips were attached thereto, as shown in Figure one. These strips were set longitudinally at about two feet intervals. When the concrete was poured, these strips formed a dovetailed mortise in the wall, the strips being removed after the walls were thoroughly set by simply pulling out the center strip, which allowed the two outside strips with beveled edges to fall away very readily. This left a perfect mortise anchor to veneer the walls with the brick tiles used. The latter were 9"x3" surface, with a perfect white glaze, far superior to anything heretofore used in San Francisco. Each brick-tile had five dovetail mortise anchors, as shown in Figure two, and each possesses a full one-quarter inch "clutch" to the cement backing, and the combination of these anchors in the tile with the anchors in the concrete wall, as above described, gives the firmest bond possible.

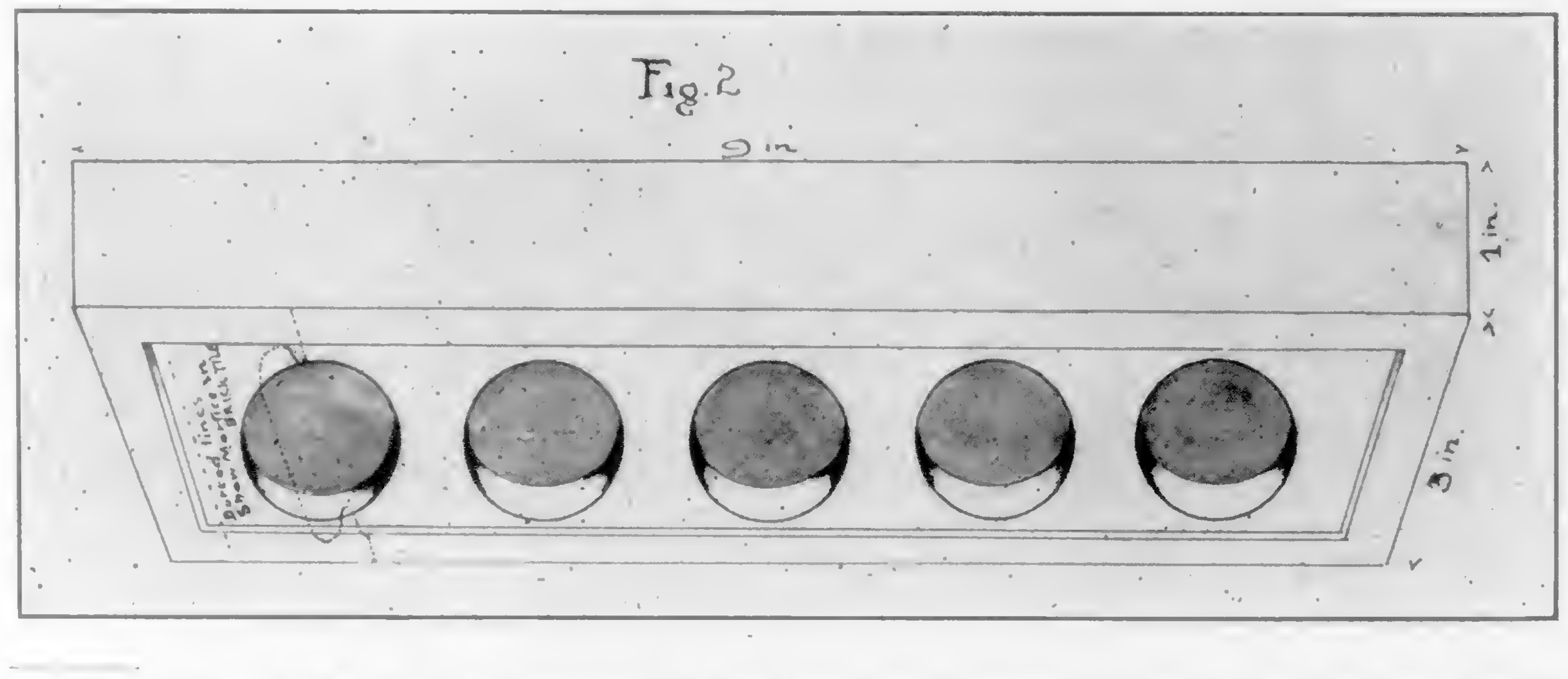


Fig. 2

Another apparent advantage of the brick-tile over ordinary glazed brick, is the fact that each of the brick-tile, on account of their peculiar shape, hang to the wall independently of each other and the only additional load to the steel frame over the minimum thickness of concrete necessary is the weight of the brick-tile, which averages about ten pounds to the square foot, while glazed brick weighs four times as much and, in addition, must depend on wire ties to hold them to the concrete wall. These wire ties may or may not occur at the proper points to make a good anchor.

There should be a great future for these brick-tiles for veneering concrete or brick buildings, and at the present time there are several buildings under construction in San Francisco in which they are being used. Notable instances are the new California Market, which is being veneered on both the Pine and California street fronts with a beautiful pale jade green shade of brick-tile, with a darker shade for the base of the building. The front light court of the Foxcroft building on Post street was also veneered with brick-tiles made of a rich cream shade to match the glazed terra cotta work on the front of this building.

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*Mr. Funge is Pacific Coast manager of the American Encaustic Tiling Co., Monadnock Building, San Francisco

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The Cement Industry for 1907

A REVIEW of the cement industry for 1907 shows that for the first time in a decade it has reached the normal condition characteristic of the other great industries of the United States. That is to say, there has been arrested the recent tendency toward speculative development which naturally followed the tremendous demand for cement. The statistics show that the Portland cement industry has now reached that stage of development where its progress and capitalization must be attended by the same care and intelligence as are applied to kindred industries.

The manufacture of Portland cement in the United States has developed by leaps and bounds. In the ten years ending with 1907, the statistics show that the production has increased from 2,430,903 barrels in 1897 to 48,785,390 barrels in 1907. This growth, as a reference to the accompanying table will show, has been at a rate of percentage per annum—even in latter years when the production has attained enormous figures—almost staggering, even to those who have grown up with the industry. From 1897 to 1899 the production almost doubled. The production of 1901 was more than twice the production of 1899. The production of 1903 was almost double the production of 1901; the production of 1905 was half as much again as that of 1903, and the production of 1906 was double that of 1903.

PRODUCTION OF CEMENT IN THE UNITED STATES
(In Barrels)

Year	Portland			Natural Hydraulic			Slag Cement			Total	
	Barrels	Value	Per bbl.	Barrels	Value	Per bbl.	Barrels	Value	Per bbl.	Barrels	Value
1897	2,430,903	$3,724,905	$1.54	7,890,573	$3,976,050	$0.50	40,000	$60,000	$1.50	10,361,476	$7,760,955
1898	3,584,586	6,168,106	1.72	8,168,106	3,819,995	0.47	157,662	235,721	1.50	11,903,326	10,223,822
1899	5,805,620	10,441,431	1.80	9,686,447	5,058,500	0.52	244,757	360,800	1.47	15,736,824	15,786,789
1900	8,482,020	9,280,525	1.09	8,383,519	3,728,848	0.45	446,609	567,193	1.27	17,312,148	13,576,566
1901	12,711,225	12,532,360	0.98	7,084,823	3,056,278	0.43	272,689	198,151	0.73	20,068,737	15,860,731
1902	17,230,644	20,864,078	1.21	8,044,305	4,076,630	0.50	478,555	425,672	0.81	25,753,504	25,366,380
1903	22,342,973	27,713,319	1.19	7,030,271	3,675,520	0.50	525,896	542,502	1.03	29,899,140	31,931,341
1904	26,505,881	23,355,119	0.90	4,866,331	2,450,150	0.50	303,045	226,651	0.75	31,675,257	26,031,920
1905	35,246,812	33,245,867	0.94	4,473,049	2,413,052	0.54	382,447	272,614	0.71	40,102,308	35,931,533
1906	46,610,822	51,240,652	1.10	3,935 151	2,362,140	0.60	481,224	412,921	0.86	51 (27,321	54,015,713
1907	48,785,390	53,992,551	1.10	2,887,700	1,467,302	0.51	557,252	443,998	0.79	52,230,342	55,903,851

* * *

He is a great man who accepts the lemons that Fate passes out to him and uses them to start a lemonade stand.

Municipal Supervision of Architecture

On nearing New York, passengers on ferryboats and transatlantic liners are often heard to exclaim: "What a pity it is the city does not do something to make the water front more beautiful!" "How ugly those skyscrapers look!" And in many a city throughout the United States, when some specially unpleasing edifice is being criticised, the remark is made: "I wonder how the town came to allow such an ugly building to be erected." To such and similar observations a simple and sufficient answer may be given: The municipality has, in most cases, absolutely no controlling power. The authority of the building departments is limited to the enforcement of regulations devised with a view to public safety, and the beauty or hideousness of the structure is left to the caprice of the owner or the fancy of his architect. To remedy this state of things, Prof. Frederick M. Padelford, of the University of Washington, in an address before the Washington State Chapter of the American Institute of Architects, printed in the "American Journal of Sociology," makes the following suggestion:

"I would establish the office of city architect as a part of the municipal government. This office would carry a very generous salary, so that a man of real worth could accept it without undue financial sacrifice. To safeguard the office from politics I would have candidates submit designs to a tribunal appointed by the fellows of the American Institute of Architects.

"The city architect would have associated with him a council, likewise chosen by merit. All plans for proposed buildings would be submitted to this body, and those that were unworthy of the city would be vetoed. Of course the architect and his council would not use their office to promote any particular styles of architecture, but would welcome individuality in so far as it was in accord with the correct principles of art. In fact, I would have the office conduct frequent prize contests for various styles of buildings, in order that the architects of the city might be stimulated to their best endeavors.

"For every building erected there would have to be an architect's plan, and in order that this might not work a hardship on the poor the office would furnish a large number of acceptable designs from which a choice might be made. For the plan thus accepted a nominal price would be paid, and this would be turned over to the architect who filed the plan with the office, and who would superintend the erection of the building. These plans could be used many times, provided, of course, that undue duplication in any one locality were prohibited. In this way I would prevent the erection of characterless little houses and the practice of stealing plans."

Those intending to erect business or office blocks would find the city architect's office particularly useful, for during regular hours of consultation experts would discuss plans with them. "The business man, his architect, and the city engineer would work out the problem of each building block together."

Another feature of the office would be courses of illustrative lectures before community clubs and high schools—systematic courses of one or two lectures a month, running through the four years. Professor Padelford thinks these lectures would be very seriously received, for he is convinced "that the majority of people want to have attractive houses, and are eager to be taught what is good."

Architects would be licensed just as doctors are, and the city architect's office would have charge of the granting of licenses, "because the city would regard quack architects as equally objectionable with quack physicians or lawyers."

As far as the architects themselves are concerned, it is claimed that nothing but good could result from such a departure, inasmuch as they "would be protected against vandalism, there would be much more work for them to do . . . and there would be the enduring satisfaction of united and systematic effort in carrying out a project in which self-interest and altruism were happily combined."

In arguing for his proposal, Professor Padelford claims that "there is no other art that compares with architecture in influence upon the life of a community, that has such a strong claim upon public-spirited men, that demands such civic concern." To the assertion, frequently made, that a great majority of people do not pay any attention to architecture, he replies that "practically all of the people are some of the time thinking about the character of the buildings they see, and that some of the people are conscious of the architecture about them practically all of the time. We are very much inclined to underestimate the attention that the less educated classes pay to architecture. . . . The architecture of a city is a matter of supreme moment to its welfare. If the architecture is ugly, it is impossible to keep the populace sensitive to beauty. It degrades and vitiates the esthetic sense, and tends to deaden the nobler spiritual emotions that attend it. If, on the other hand, the architecture is uniformly good, it tones the whole community life."

Beautiful buildings exert a great influence on the lives of the inhabitants, for they add greatly to the happiness of people, it being "the normal function of beauty to make us happy."

"The experience of happiness is always attended by an expanding of the life, an enlargement of the sympathies, a fruitful quickening of the social impulse; and those familiar with the 'model villages' insist that this indirect moral effect of beauty is very great."

With regard to the cost of his proposed scheme, Professor Padelford considers that $15,000 a year would cover it—"an average cost of 5 cents apiece, the price of a plain soda or of a pair of shoestrings, when the city has 300,000 inhabitants."

The result would be a city of unique beauty, and a happier and more moral people. Moreover, architecture itself would receive a great stimulus.

* * *

Building Permit Ruling

An interesting ruling in reference to the constitutionality of the building permit ordinance has been made by a judge in Milwaukee to the effect that cities have no right to compel their own citizens to take out permits in order to conduct building operations.

The decision followed a suit undertaken by the city to compel the Wisconsin state board of normal school regents to take out a permit before commencing the erection of a proposed normal school building in Milwaukee. The judge held that the city had no right to compel the state to comply with a city ordinance, and incidentally he declared the city had no constitutional right to compel its own citizens to do so.

* * *

First Aid

"Writing to Charlie?"

"Yes."

"I thought he was engaged."

"He writes me that his girl has thrown him overboard, so I'm dropping him a line."—Kansas City Journal.

Among the Architects

American Institute of Architects

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Convention of American Institute of Architects

THE Board of Directors of the American Institute of Architects has decided to hold the next convention of the Institute in Washington on December 15, 16 and 17, concluding with a dinner on the evening of the 17th. The topic to be considered at this convention is the creation of a department or bureau of the Federal Government, with a board of consulting artists, which would have control of buildings, landscape work, statuary, paintings and mural decoration, so as to harmonize and systematize work of this character under the jurisdiction of the Government. On the evening of December 15 a reception will be given in the Corcoran Art Gallery to view the work of Augustus Saint-Gaudens, the meeting to be a memorial tribute by the institute to his memory.

On the evening of December 16 speeches are expected showing the necessity of one department or bureau controlling the fine arts of the Government.

The president of the institute has appointed as a committee of arrangements, William A. Boring, S. B. P. Trowbridge, Glenn Brown, William S. Eames and J. R. Marshall

The president of the institute at the June meeting of the Board of Directors appointed Alfred Stone (since deceased), J. L. Mauran and Glenn Brown as a committee to select a name or names to present to the Board of Directors at its next meeting as the recipient of the institute gold medal at the convention.

Oakland's Great Hotel

The Oakland Hotel Company will rush work on the new $1,500,000 Bankers' Hotel, between Harrison, Alice, Thirteenth and Fourteenth streets, in Oakland. Complete working plans for the new hostelry have been received by the supervising architect, Mr. Matthews, and contractors will be called upon to bid upon the construction of the hotel within a short time.

The plans have been changed somewhat by architects in the East, which has resulted in a delay in starting the actual construction. The foundation and basement were completed some time ago. Bids will be received for the building of the entire structure.

The stockholders of the company present at a recent meeting were: W. G. Henshaw of the Union Savings Bank, W. G. Palmanteer of the Central Bank, Edson F. Adams of the Farmers and Merchants' Bank, W. W. Garthwaite of the Oakland Bank of Savings, A. J. Snyder, W. J. Laymance, W. H. Leimert, Frank J. Woodward, George W. Austin, and R. F. Jackson.

Architects Meeting

The annual meeting of Southern California Chapter A. I. A. took place in October.

The election of officers for the ensuing year was the most important part of the business session. Myron Hunt was elected president; J. Lee Burton, vice-president; F. Parmentier, secretary, and August Wackerbarth, treasurer. Directors, Octavius Morgan, Arthur B. Benton, A. F. Rosenheim, R. B. Young and C. H. Brown.

The chapter received notification of the election of Myron Hunt to fellowship in the American Institute; also that Edwin Bergstrom had been elected an associate member of the Institute. The reports were unanimously endorsed by the chapter.

The annual convention of the American Institute of Architects takes place in Washington, D. C., December 15, 16 and 17. The election of delegates was deferred until the next regular meeting.

Architect J. A. Walls, who has lately returned from an extensive European trip, was present and related the incidents and adventures encountered during his sojourn in the old world.

Personal

Architect Arthur T. Ehrenpfort announces the removal of his office to the Russ building, Room 335, 235 Montgomery street, San Francisco.

Architects Stone and Smith have moved from Kearny street to larger and more central offices in the Mechanics Savings Bank building, San Francisco.

Architect Injures Foot

Architect Coxhead, junior member of the firm of Coxhead & Coxhead, of San Francisco, is recovering from an injury to his foot, the result of a fall in the Home Telephone building, of which he is the architect.

Y. M. C. A. Buildings

Architect Arthur B. Benton has prepared preliminary drawings for the proposed new Y. M. C. A. building to be erected at Riverside. It will be 83 by 185 feet, three stories and basement, and constructed of brick. The basement will contain gymnasium, 40 by 76 feet, locker room, 40 by 54 feet, plunge 20 by 60 feet, club room 12 by 34 feet, cafe 25 by 40 feet, barber shop and Turkish baths 20 by 60, and kitchen department. The first floor is divided into lobby, lecture and dining room, check room, locker, boys' and lecture rooms, etc. The second story will be divided into four class rooms, twenty-six bed rooms and bath and toilet rooms. The third story will have thirty-four rooms, together with the necessary baths and toilet rooms, closets, etc. The plunge and gymnasium will be to the full height of the second story. Above the plunge will be located a basket ball court. A roof garden will extend over the entire building. It will be constructed of slow-burning material, and will cost about $60,000.

The same architect has made plans for extensive additions to the present Y. M. C. A. building, at Redlands.

Handsome Hotel

Plans have been drawn by Architect M. J. Lyon for a handsome hotel at Van Ness avenue and Pacific street, San Francisco. The new hotel will be of class A construction, eight stories high and will contain 200 rooms. Its special features will be an Oriental tearoom, ladies' reception rooms, Louis XIV ballroom, a solarium on the roof to be fitted up as a Pompeiian garden, and affording a marine view, extending from the Golden Gate to Berkeley.

The plan of the building is designed for the pavilion type, similar to the St. Francis Hotel. Another distinctive feature will be the apartment hotel plan, consisting of apartments of three to eight rooms each, with independent reception halls and all conveniences of a home. Some of the apartments will have living rooms, libraries, private dining rooms, bedrooms, serving and servants' rooms. The dining room is to be finished in English oak, with an orchestra balcony and a seating capacity of 200. The private dining rooms are to be featured in character and design. Contracts for this building will be let as soon as the papers are signed. The cost of the building will be about $225,000.

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U. S. CAPITOL OFFICE BUILDINGS

The readers of the Architect and Engineer of California will undoubtedly be pleased to see that some of their tax-money has been so well expended in the two additions, one completed and the other fast approaching completion, that have recently been made to our national architecture at Washington, D. C.

The most pleasing feature about these buildings is that their designers have been wise in not attempting to do anything "wonderful" with them. Many architects would have tried to inject some special individuality into such an opportunity, topped the thing off with a dome and added other "fixings" that would have made such building very conspicuous, loud and aggressively personal. In these two great structures, however, the architects have realized that they were but component parts of the main, domed and beautiful Capitol, mere adjuncts, and should properly be dominated by the latter building, from which they are separated but by a street. The two buildings are virtually alike in design, most pleasing, dignified and quiet and in a minor key, properly balancing the main composition, and are altogether most satisfactory. One of the buildings is illustrated in this number of the Architect and Engineer, the illustrations and description being supplied through the courtesy of the chief draughtsman in charge of the work, Mr. Oscar Wenderoth.

"FIRE—AN AMERICAN EXTRAVAGANCE"

This is the title of a stirring article in the November "McClure's" by Architect F. W. Fitzpatrick of Washington. The author gives startling figures that certainly must not have been generally known or there would have been greater activity on the part of our authorities in the direction of fire-prevention by compelling builders to build better. He

cites the losses and expenses caused by fire and shows that the grand total is nearly $600,000,000 a year of what might be called, wasted expenditure. Compared with that figure he states that all the building and repair work done in a year's time does not exceed $615,000,000. In five years the total of fire losses alone without their attendant expenses amounted to $1,257,716,000!

Further on he describes the remedy for this appalling state of affairs and advises that nothing but first-class construction be permitted in cities. He advocates the enclosing of all stairways and elevators, the protection of outer windows with wire glass and metal sash, the minimizing of wooden finish and furniture, using in lieu thereof steel and other non-combustible materials and believes that a steel frame structure, protected with hollow fireproofing tile and with outer walls of brick and terra cotta constitutes the ideal building for the ordinary city commercial purposes.

The writer, who is the consulting architect of the International Society of Building Commissioners, also advocates the labeling of all public and semi-public buildings by the building departments just as to their nature, "fireproof," "ordinary," or "dangerous," and believes that this official labeling would compel owners of inferior buildings to improve them and would deter people from building more of the same kind.

GROWTH OF THE CEMENT INDUSTRY

The cement industry in the United States has now reached that stage where it may safely be classed as one of our staple products and no longer subject to sharp advancement or serious decline. In short, cement has reached the normal condition of other leading industries. Competition and a declining market have resulted in what may be likened to a weeding-out process, which must eventually be conducive to the general good health of the industry. Purely speculative enterprises and those of mushroom growth have been badly nipped by the financial frost, while plants established upon a sound basis have survived and may look for the return of prosperous times, if they are not already at hand. The development of the industry from something over two million barrels to nearly fifty millions in the brief period of ten years was one of the most remarkable industrial evolutions in the history of the country, if not in the entire world, and it was not surprising that many entertained the conviction that this was to endure, especially in view of a corresponding increase in new uses for cement.

Important progress has been made in methods of manufacture which will tend to cheapen production and maintain if not improve quality. It is interesting to note, says "Cement Age," that specializing has commenced in the manufacture of cement such, for example, as to the production of the white cements especially adapted to architectural work of ornamental character. This is but one of the many steps forward that have marked the advance of the industry in the last year or two and those who are competent to judge predict a future that is, indeed, most hopeful.

Business Sense

"There's one piece of advice," said the senior partner, according to the New York Press, "that I'd like to give every young man taking a business position with a desk attached to it. It's this: Keep your desk clean. What I mean by having a desk clean is keeping everything possible off it except that which is related to the matter in hand. I've observed in my time a good many men in their offices, and I can say that with very few exceptions the real men of affairs are those whose desks are free from clutter.

What with filing cabinets and other devices no excuse can be offered nowadays for confusion.

"A well-ordered desk means a well-ordered mind, a mind taking up one thing at a time and giving it the proper attention. It denotes regularity and concentrated, effective effort."

HEATING AND LIGHTING

Material Arranged by Carl E. Roesch, Edwin B. Pike
and Wm. E. Leland, S. B.

Proper Construction of a Warm Air Furnace

By An Old Timer.

II.

IN THE August number of the Architect and Engineer we discussed the relative difference between the warm air furnace and the old-fashioned fireplace, and promised in a later article to give what we considered the proper construction for a warm air furnace, suited to conditions that exist in a climate such as we have on the Pacific Coast.

Practically all of the warm air furnaces used on this coast are made by Eastern manufacturers, and sold to dealers on this Coast with no other idea than simply to market their goods—paying no attention whatever to the question whether or not the same are adapted to conditions.

Owing to the fact that comparatively little heat is required the dealer has invariably bought and installed furnaces that were inadequate to do the work intended. To begin with, we must recognize the fact that a room to be warmed must be entirely filled with warm air, and that a room fifteen feet square with a ten-foot ceiling is just as large here as it is anywhere else, consequently it will require the same volume of air to fill it.

The object of any first-class heating and ventilating engineer, whether planning the job for a gravity or mechanical installation, is to design an apparatus which will fill the room or building with warm air in the very shortest possible time. Air handled in this manner can be delivered into a room at a relatively low temperature and at comparatively low cost for fuel. If this is the case it is evident that a room which can be filled with warm air in fifteen minutes can be properly warmed in the same length of time, and to do this it requires, first, a furnace with a casing area fully as large, if not larger, than the combined area of all of the warm air pipes taken therefrom, and that each warm air pipe should have sufficient area to fill the room to which it leads, every fifteen or twenty minutes.

* * *

Warm air flows with varying velocity and, under gravity installations, can never be computed absolutely. The average flow, however, has been placed at 200 lineal feet per minute, covering the whole flow from the average residence installation. The writer has found that the average flow in this climate is 187 feet per minute, and this average was taken from thirty different installations which were carefully tested with thermometer and anemometer, and for that reason we have used 180 lineal feet per minute as a working basis. From this we compute the size of the warm air pipes, and the sum of the area of the warm air pipes gives us the size necessary for the furnace, and we usually allow the casing area of the furnace to be at least 20% in excess of the total area of the warm air pipes. The question that will now naturally arise in the reader's mind is that we are insisting upon the use of as large a furnace for this climate as we would if zero weather prevailed. This is not the case, but we do insist upon a furnace that has as large a free area through the casing of the furnace as would be used in zero temperature, and the difference in the construction of the furnace is considerable, due to the fact that in this climate the initial or register temperature of from 100 to 120 degrees is sufficient where a proper flow of air is obtained and the temperature rarely goes below 30 degrees, or, in other words, you have to change the volume of air from 70 degrees to at most 90 degrees.

Where zero weather prevails, the initial or register temperature of 140 degrees is considered the minimum, which makes it evident that the volume of air must be changed at least 140 degrees,

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consequently it requires a larger radiating surface and a larger grate surface to change the same volume of air from zero to 140 degrees or more, than it does the same volume of air from 30 to 100 or 120 degrees.

* * *

So far as the writer's knowledge goes on this subject there is only one manufacturer who has, up to this time, endeavored to meet this question, and as this is not an advertising proposition, but simply a plea for the better consideration of the warm air furnace, we do not feel at liberty to mention the manufacturer's name.

For the actual consideration of the furnace itself, or the part which contains the fire, this should be of such construction that it would be absolutely gas tight, without the use of cement, and with fuel and ash-pit doors large enough to permit of cleaning and firing, and so arranged that all linings and grates, etc., can be taken out and replaced without disturbing the furnace setting itself. Especially in this climate, where light firing is required and quick results are wanted, it should be of such construction that it will permit of the use of old trash, light wood and other rubbish for fuel. As oftentimes with properly constructed and installed warm air apparatus, a fifteen minutes' fire with trash used morning and evening will give all the heat required, unless the weather is exceptionally severe.

In a later article we will follow up this proposition with an example of properly arranged gravity residence installation.

Don't Blow Out the Arc Lamp

A new negro messenger in the library of the Navy Department was told by a sophisticated messenger of his own race that a new arc light recently installed there could be blown out.

"Sho," he said, "yo' cain't blow out electric lights."

"Not that kind," said the other, pointing to the incandescents; "but you can these. Try it."

Neither the first puff nor the second was successful, but on the third, into which an extra effort had been put, the light went out.

"There," said the sophisticated one, who was leaning carelessly against the switch button.

The new darky started out to spread the news. He struck incredulity in a messenger just around the corner of the corridor.

"I know yo' cain't blow out dem in bottles," said the new messenger, "but yo' cain dese. Bet you a dollah I does it in free blows."

That is where he paid a dollar tuition.

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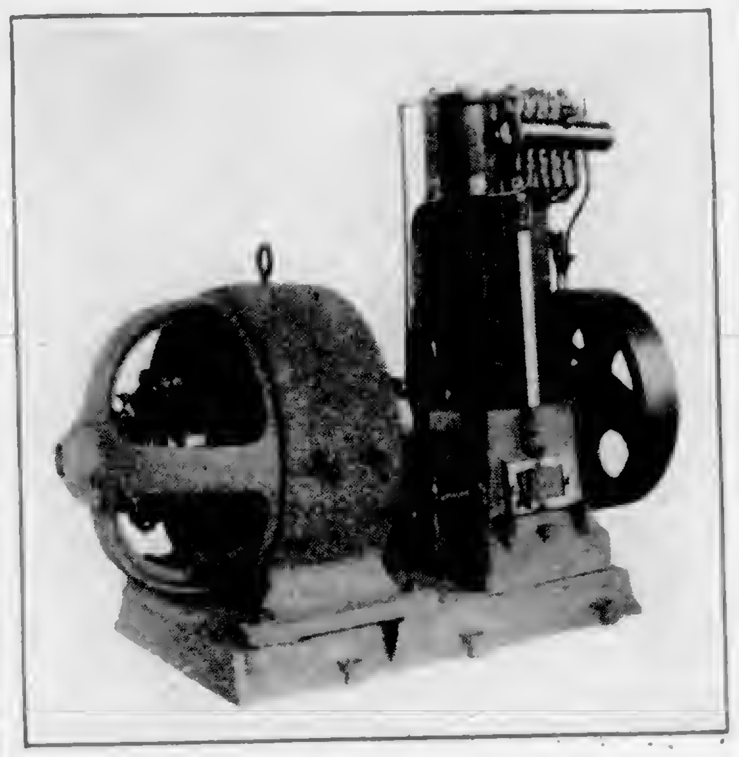

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Contractors Association and Its Purpose.

By EDWIN B. PIKE.

The San Francisco Branch of the National Electrical Contractors' Association holds its regular weekly meetings in the Grant building. A number of the contractors, on meeting nights, dine at a down-town restaurant and then report in a body at the meeting rooms.

The association is taking quite an active part in exposing poor electrical wiring, which will be of great assistance to the owner, builder and the Department of Electricity.

For some time, especially in the districts that were built up immediately after the earthquake and fire, electrical work has been a disgrace, being, in some cases, literally thrown in, without regard to any rules or regulations whatsoever. It would be well for the architects and engineers to see that when a building is being wired the contractor installs his work properly. Special attention ought to be paid to the splicing of wires and loose connections, as this is where the fire hazard lays.

The Department of Electricity does its best to inspect all work, but naturally it cannot have a representative on the job at all times, therefore the architects should pay a good deal of attention to the "roughing in" of electrical work, especially in knob and tube installations. This would be of great benefit to the conscientious contractor as well as the owner, and would aid the association very materially in its good work.

Oakland's Tourist Hotel to be Built

The stockholders of Oakland's proposed new tourist hotel have voted to continue the work of construction which was stopped about a year ago when the money stringency became so acute. Work on the building was commenced two years ago. The excavating was completed and the foundations started when orders were received to stop. It is now proposed to take bids for the actual construction work. The plans for the hotel were drawn by Henry J.

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Hardenbergh of New York City, the style being free renaissance, the size 200 by 300 feet, 500 rooms and the cost $1,000,000 or more. Walter J. Matthews of Oakland is the supervising architect and bids for the completion of the building will be received by him.

Simplicity as An Element of Decorative Art*

By E. L. Elliott.

WE have several times before preached from a text taken from Emerson, to wit: "We ascribe beauty to that which has no superfluous parts, which exactly fulfills its purpose." Believing also that example is better than precept, it is our present purpose to attempt a further exposition of this doctrine by the study of a few examples.

Bad art might be divided into two categories: that which is ugly, and that which is tawdry. The first arises from the extreme of simplicity—a simplicity that leaves the object in physical and mechanical nakedness. Such for example, is a gas fixture made of common iron gas pipe put together with ordinary pipe fittings, or an electric drop light consisting of a socket hanging by a flexible wire. Tawdriness on the other hand, most often arises from an indiscriminate use of inharmonious or superfluous ornamentation. Tawdriness is not necessarily synonymous with cheapness, but is invariably the result of overdoing the thing. Conversely; good art is by no means confined to expensive production. As an illustration of this latter fact, examine the table lamp shown in Fig. 1. It is difficult to conceive of a more simple construction outside of the naked mechanical essentials; yet there is harmony and grace in the few curved lines of the standard and shade which produces a distinct feeling of beauty. Every part can give a satisfactory reason for its existence.

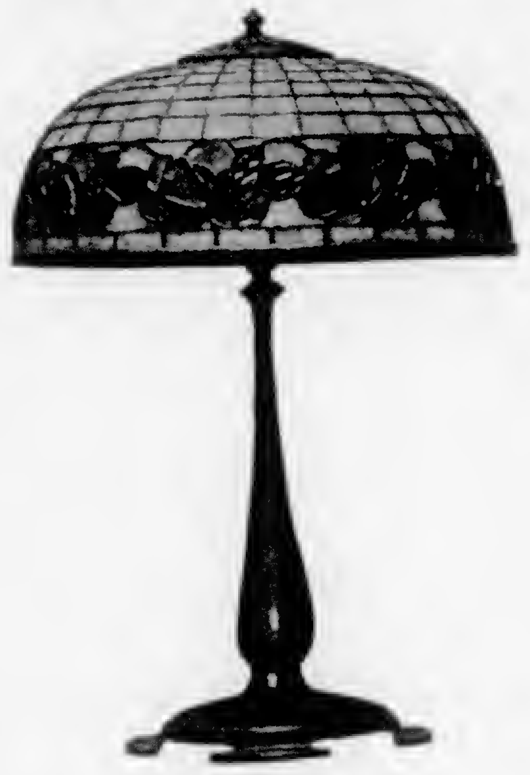

Fig. 1

Keeping our text still in view, let us next examine Fig. 2. There is first a base of sufficient size and weight to give the necessary stability. The central standard is of sufficient strength to support the lamp and shade without being clumsy, while the loop at the top sug-

---

* The illustrations shown in this article, which is reprinted from "The Illuminating Engineer," are of fixtures executed by the Enos Co.

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gests a convenient means of carrying the lamp. As a matter of actual mechanics, the lamp would stand just as firmly without a brace to the supporting arm opposite the shade; but this fact is the result of a critical study of the mechanism, which the mind does not readily make. This brace instantly appeals to the eye, and satisfies the instinctive query as to stability. Without this simple little device the involuntary thought would immediately arise that the lamp must tip over from the weight of the shade. The loop in the supporting cord, enabling the height of the lamp and shade to be varied is a complete justification for the general plan of construction. Note further the simple grace of all the lines.

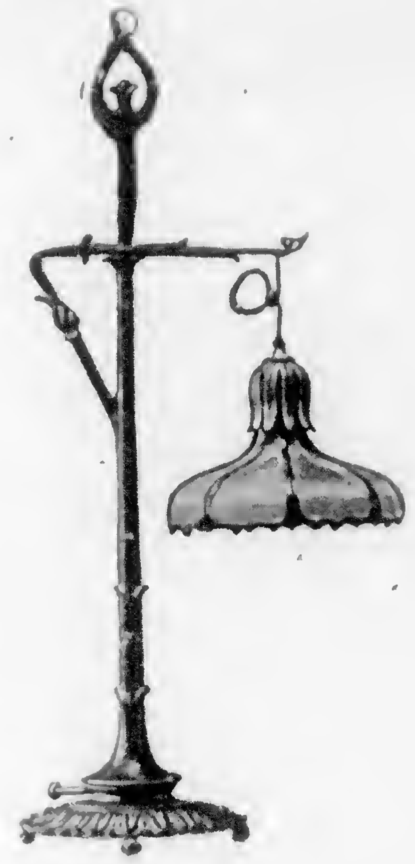


Fig. 2

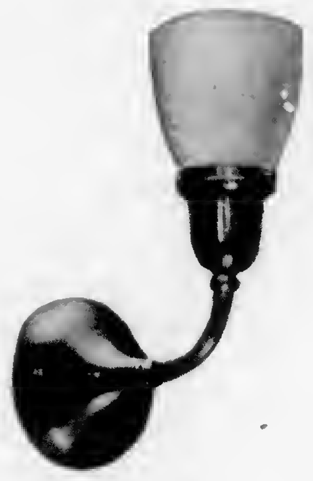


Fig. 3

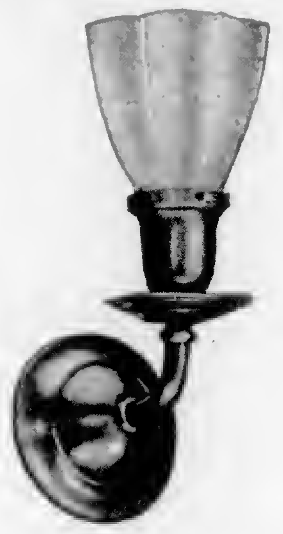
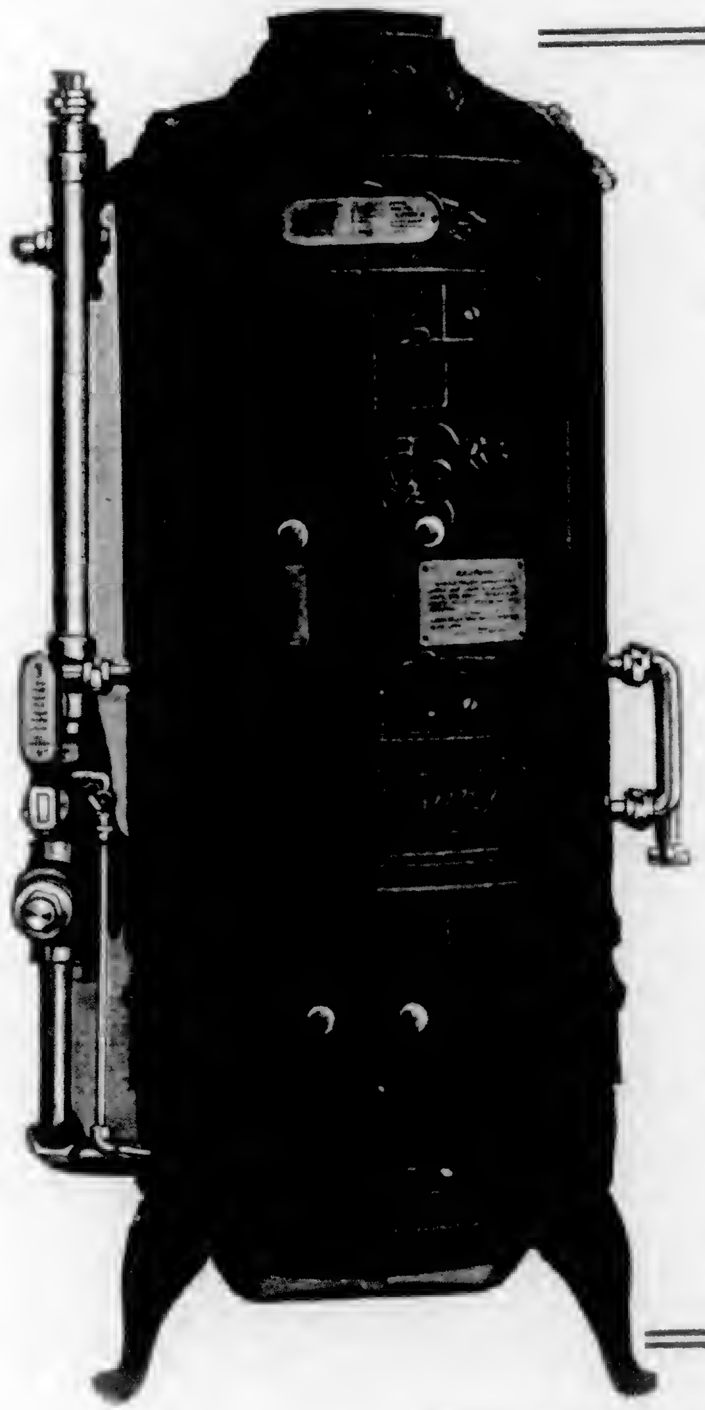


Fig. 4

The comments made concerning Fig. 1 would apply equally well to the bracket shown in Fig. 3. Both examples literally fulfill the tenets of our text. Applying the principle to Fig. 4, however, we find one manifestly superfluous part, namely, the metal saucer or disc immediately under the lamp socket. Which of the two is the more artistic? Compare in the same manner the brackets shown in Figs. 5 and 6.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Figs. 7 and 8 afford a similar comparison, Fig. 7 being perfectly simple, while 8 has the superfluous plaques under the sockets, and the vertical piece between the lamps.

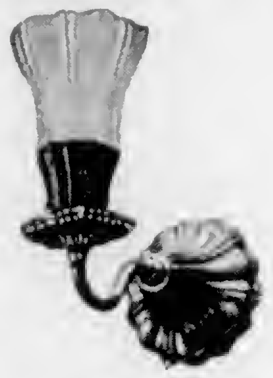
Fig. 5

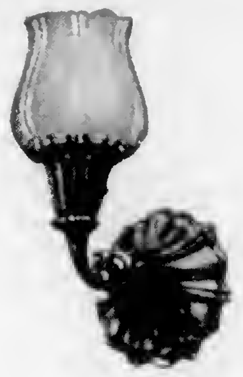
Fig. 6

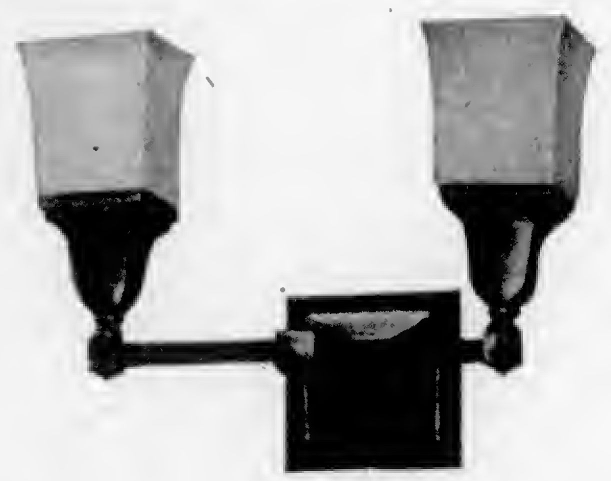
Fig. 7

Fig. 9 shows an apparent violation of the principles of our text. The construction of the supporting arm, with its two points of attachment, and the general lines are thoroughly good, but the effect is marred by a pyramidal boss on the wall-plate. This projection has no visible reason for its existence, and suggests that a part intended for some other construction has been purloined. The suspicion is confirmed by reference to Fig. 10, which shows a legitimate, and therefore artistic use of the same piece. The fixture manufacturer himself, and also the electrical contractor, will be able to give a sufficient reason for this construction, however. In many cases the outlet box is left projecting; or there may even be a capped gas pipe to reckon with. In order to make the fixture adaptable to all conditions therefore, the wall-plate is made with the boss as shown. The presence of the "candle-fraus" on the electric brackets is simply a concession to custom and the demands of trade.

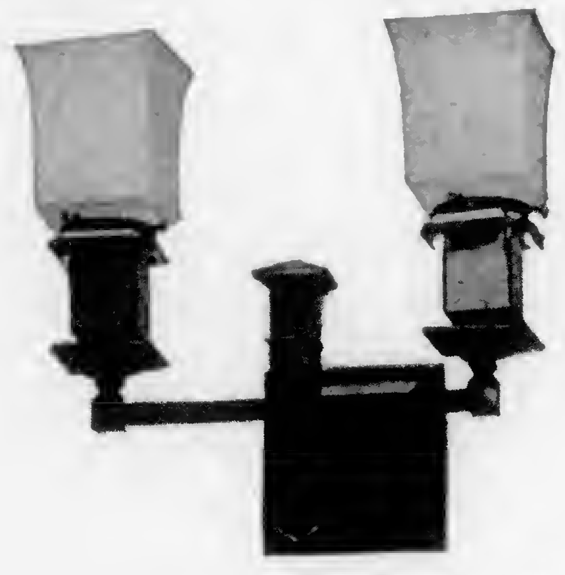
Fig. 8

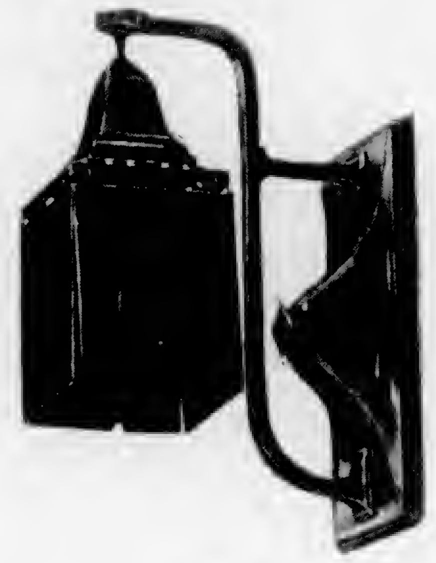
Fig. 9

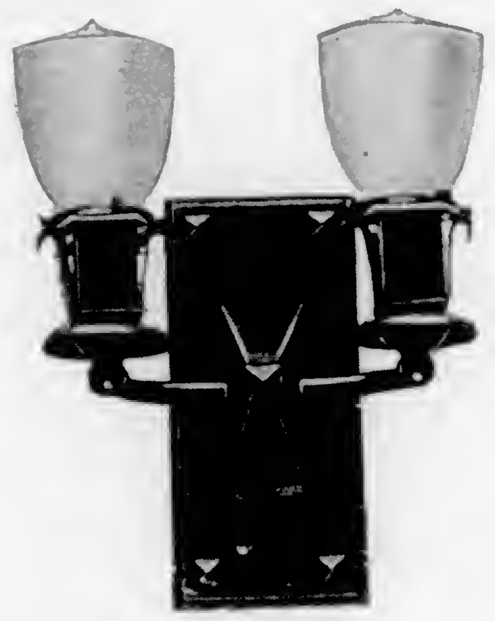
Fig. 10

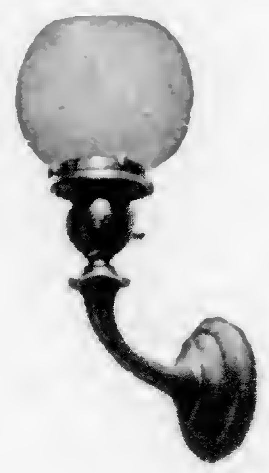
Fig. 11

Fig. 11 is an exceedingly fine example of the beauty of single curves. Compare it with Fig. 3, and note how much the varying diameter of the supporting arm enhances its appearance. This slight curvature, however, necessitates a casting in place of the plain bent tube used in Fig. 3, which of necessity adds much to the cost of construction; which shows that apparently slight modifications in design may influence the cost to a degree beyond what might at first seem reasonable to those unfamiliar with manufacturing details.

By the Way

Some Industrial Information Worth the While

An Ideal Hospital Flooring

The California Peerless Stone, Tile and Plaster Company, whose factory and works are at San Leandro, and office at 109 O'Farrell street, San Francisco, reports a good demand for its composition tiling. It has been found to be especially serviceable for hospitals, the magnesia composition making a floor that is not only fireproof and waterproof, but perfectly sanitary. The tile is used exclusively in the Merritt Hospital in Oakland, Nathaniel Blaisdell, supervising architect. The entrance floor is in three colors, two shades of red and yellow being used. The same tile is used on the floors in all the corridors, toilets, kitchen and pantries, ward rooms and operating rooms. A total of about 10,000 feet of tiling is used in this building. In the Keatinge apartments on Ellis street, San Francisco, which were designed by Architects Shea & Lofquist, Peerless stone is used for exterior ornamentation, and the tile has been laid in the toilets and bath rooms. It is expected the company's products will be accepted in the new St. Mary's Hospital and several other hospital buildings that are to be erected in San Francisco the coming year.

Improved Safety Tread

A new and improved safety tread has just been put on the market and bids fair to eclipse all others now in use. The tread was invented by a San Francisco man and while it has been used several years on all the steamships of the Oceanic Steamship Company, no effort has heretofore been made to market the step in connection with local building construction. It is known as the Fortro Patent Improved Rubber Stepping, and is pronounced the most economical, cleanest, safest and most durable of all rubber steps in use today and can be placed on marble, concrete, iron or wood. When one portion of the rubber is worn it can be easily and quickly replaced at trifling cost. Messrs. Murphy and Orton, 268 Market street, are sole agents and manufacturers of the new tread.

Successful Plumbing Contractors

Albach & Maver, plumbing contractors, whose main office and shop is at 25 Dorland street, San Francisco, have done the plumbing in the following buildings: Seven story brick building on Market street, near Seventh, Macdonald & Applegarth, architects; two story brick building on Market street, near Larkin, and designed by Price & Hutchinson; five story brick Chinese Mission on Portsmouth Square, Francis W. Reed, architect; two story and basement flat building on Hayes street, Welsh & Carey, architects; three story and basement apartments, Mason near Sacramento street, W. W. Rednall, designer and builder; and a three story and basement brick building on Kearny street, between Sacramento and California, Wm. Mooser, architect. The work done by this firm speaks for itself.

Interior Work His Specialty

C. E. Gordon of 1235 Pierce street, San Francisco, is doing some high class work in house painting and interior decoration. Mr. Gordon was for six years foreman for O. V. King and for the past three years he has been in business for himself, building up a splendid trade in apartment house and residence work.

Mackenzie Roof Company

The Mackenzie Roof Company of Oakland has recently filled several important contracts in that city. The company makes a specialty of felt and gravel roofing, and among the buildings roofed with this material are the McGregor apartments, the Merritt Hospital and the Brown and Adams cannery. The handsome residence of Mr. R. E. Bousfield at Claremont was roofed by Mr. Mackenzie, as well as several other houses across the bay. A contract has been signed with the Globe Construction Company for roofing the Western Power Company's new building in Oakland.

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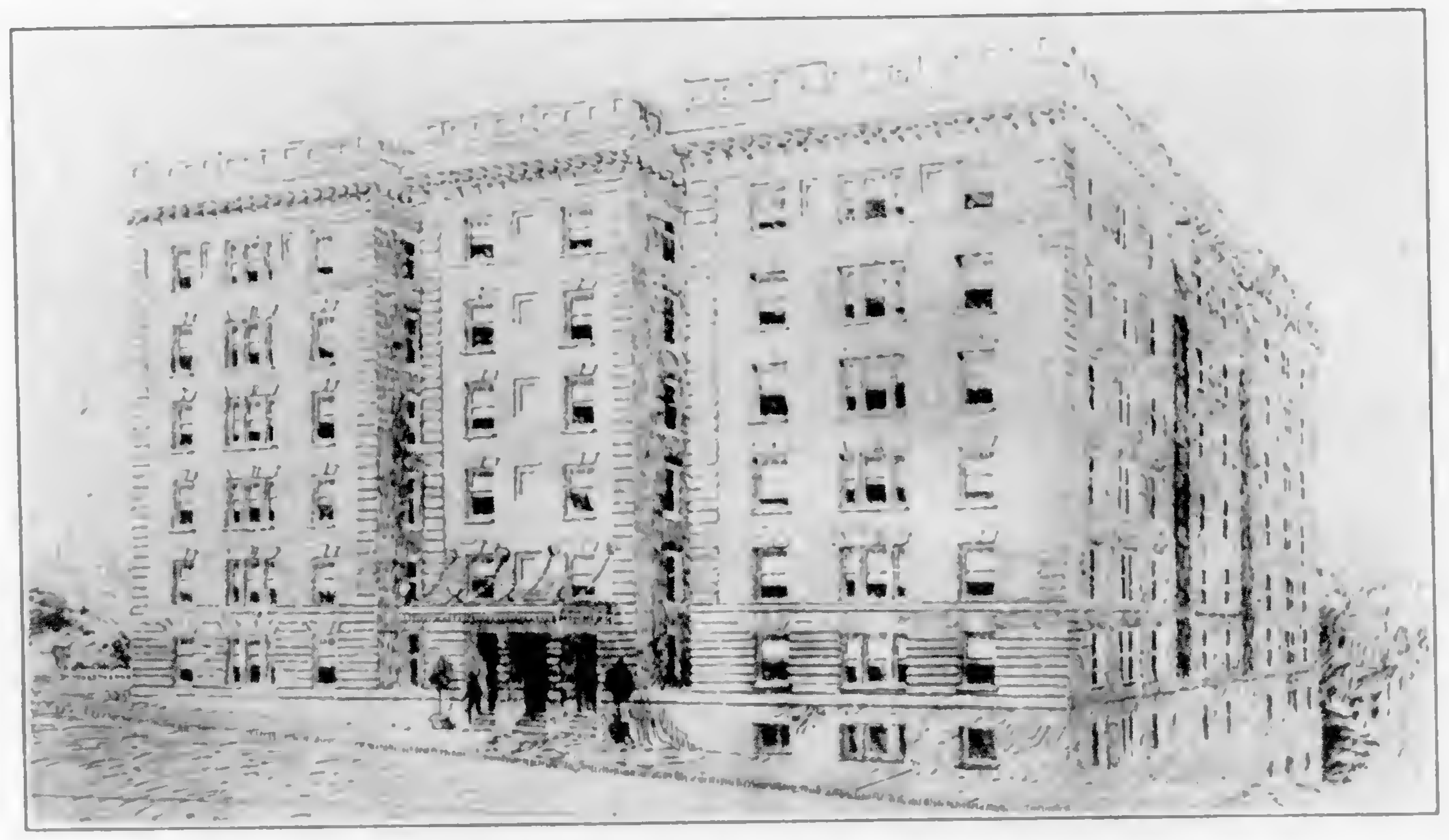

Keystone Apartment House San Francisco—Oliver & Foulkes, Architects.

The Keystone Apartment House now being built at Washington and Hyde streets, the light wells of which are faced with **"Golden Gate Sandstone" Brick**, a white pressed brick made of sand and lime (no cement) from the **Golden Gate Brick Co.**, C. F. Pratt, manager, 660 Market street, opposite the Palace Hotel. Factory, Antioch, California, and San Francisco warehouse at North Point street. Phone or write for photos of buildings built of our sandstone or sand lime brick, as well as samples of our brick.

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New Catalogue

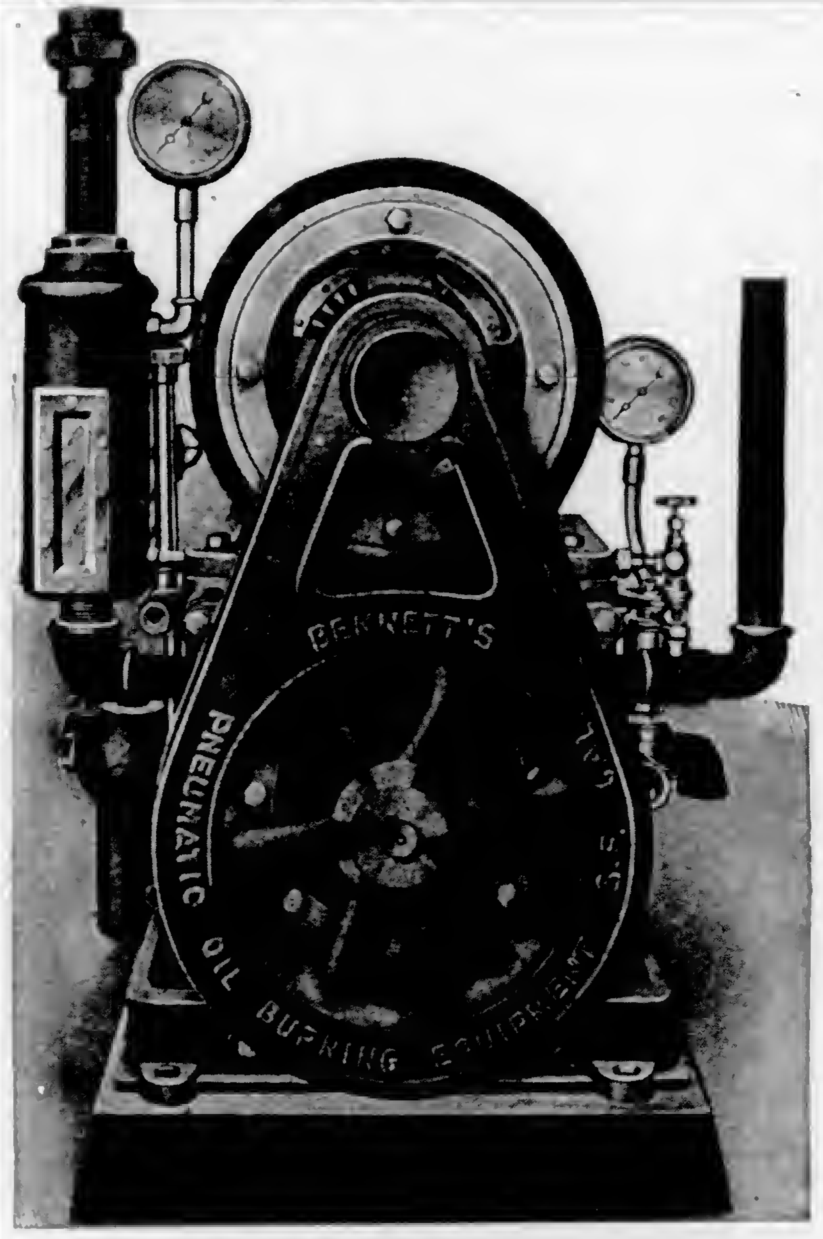
The Steiger Terra Cotta and Pottery Works have just published a new catalogue containing much interesting information to architects, builders and others in the market for architectural terra cotta, fire brick and fire tile, together with price lists and illustrations. The Steiger Company is specializing in hollow tile fireproofing and roofing tile, for which there is a considerable demand. The company is also manufacturing some very handsome brick and tile mantles, this in addition to its regular output of architectural terra cotta, semi-dry pressed brick, terra cotta chimney tops, drain tile, etc. The Steiger Company's main offices are in the Mills building, San Francisco.

Cement Products Exhibition

It has been decided to hold the second annual cement show in the Coliseum in Chicago, February 18 to 24, 1909. The date chosen, it is believed, will prove very satisfactory, coming, as it does, just prior to the opening of the cement season. Unusually elaborate and comprehensive preparations are being made to interest in the coming show, not only those directly connected with the cement trade, but the general public as well. The underlying idea of the exhibition is educational in its nature and not entirely for the purpose of bringing direct business to the exhibitors. It will be more in the way of an industrial demonstration calculated to create universal interest in cement and its innumerable uses.

Circular Rooms Bad for the Mind

That circular rooms are distinctly bad for the mind is argued by the Chicago "Journal." It says that experts in mental diseases who have made a study of conditions at the Minot Ledge Light attribute the unusual prevalence of insanity among the keepers of this lighthouse to its peculiar form of structure. There is no point, they say, on which the eye may rest, so it travels round and round in a maddening whirl. They, therefore, suggest that some means be devised for filling the curves and producing corners and angles. In support of their theory they cite instances of men who have lost their mental balance during long confinement in circular prisons, but have quickly regained it on being transferred to an ordinary room of corners and angles. Baron Trenck spent much of his time in prison making marks and corners to break the circularity of his surroundings and keep his reason from slipping away on the whirling and encircling walls. Casanova, an Italian engineer, who was imprisoned in a round tower, gives much the same testimony.



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Modern Requirements and Modern Methods

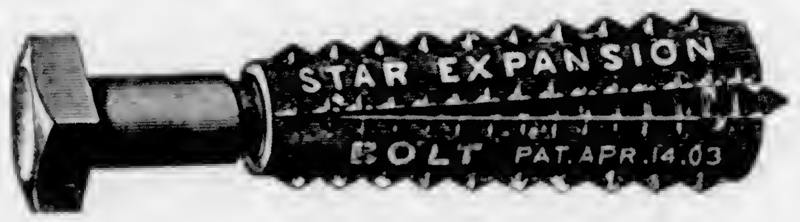
In connection with the erection and finishing of the average modern structure, there are many fastenings of one description or another, to be made to brick, stone, marble, tile, concrete and other masonry.

In the old days, one first used wood plugs, which were never satisfactory, because, as is well known, wood expands and contracts under climatic changes to such an extent that the fastening is never positively secure. Then, too, in a very short time the wood plug rots away so that the fastening at best is only temporary.

Next came what is known as the "Leading-in" process, which while messy and tedious, really did mark an improvement over the unstable wood-plug method. In "Leading-in" the hole to be drilled is necessarily a very large one, for it must provide not only for a space to accommodate the bolt or screw, but also for pouring in around the same a quantity of molten lead, which cooled and hardened, made a fastening at least secure. This tedious process while an improvement, only served to emphasize the necessity for a better way.

Then came the Star Expansion Bolt, designed and produced along studied principles in various sizes to conform to the ordinary bolts and screws in everyday use the country over.

The principle involved is so simple, the expanding qualities so positive and sure, the use and application so easy, that it must seem that finally a really puzzling problem has been satisfactorily solved.



Star Expansion Bolts and Anchors in their many various styles and sizes have gained universal recognition as the modern improved means of making attachments of any sort to all kinds of masonry, marble, tile, slate, and like material. They are made in either malleable iron, brass, or lead composition metal, in any size from 1/8 inch to 2 inches in diameter, to fit wood screws, lag screws, or machine bolts.

The advantages briefly summed are as follows: Smallest possible drilled hole for insertion. Ease in using—time and labor saved. Adaptability of expansion parts for use with stock bolts and screws. Positive expanding and holding qualities—strength, and a clean cut finished appearance, which ornaments rather than defaces surface matter.

Star Expansion Bolts and Anchors are daily demonstrating their time and labor saving qualities to thousands of carpenters, builders, plumbers, electricians, iron workers, and others who have investigated the claims made for them. If our readers desire to become better posted we have arranged with the manufacturers—the Star Expansion Bolt Co., of Bayonne, N. J., to send samples and catalogue (completely descriptive of a line comprising expansion bolts, toggle bolts, and drills for brick and stone) promptly upon direct application to the Bayonne office.

"Why didn't you put on the porous plaster I sent you?"

"Docthor, I'm a mimber ov th' Hod Carriers' Union, and it's against th' rules for me to do anny plastherin' except in the reg'ular workin' hours."

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The Value of an Ad.

Lillian Braythwaite Hill, the very successful writer of humorous advertisements, spoke at a business men's dinner in Chicago on "Fun in the Ad." Miss Hill began in this way:

"Does it pay to advertise? Well, I should say so. A man came to an editor in the town of Shelbyville one day and asked that question.

"'Does it pay,' said the man, 'to advertise in your paper?'

"'Does it pay to advertise in my paper? You just bet it does,' the editor replied. 'Look at Sands, the cash grocer, for instance. Sands advertised for a boy last week, and the very next day Mrs. Sands had twins—both boys.'"

Strongest Known Wood

Recent tests of the hardwoods of Western Australia have revealed the extraordinary properties of yate, believed to be the strongest of all known woods. Its average tensile strength is 24,000 pounds to the square inch, equaling that of cast iron. Many specimens are much stronger, and one was tested up to 17½ tons to the square inch, which is equal to the tensile strength of wrought iron. The tree grows to a height of 100 feet, and a diameter of two and a half.

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For Delivery of Freight and Packages in Wholesale Stores, Warehouses, etc.

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What One Large House Thinks of the Spiral Chute

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SAN FRANCISCO, Sept. 16, 1908.

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Yours very truly,
M. J. BRANDENSTEIN & Co.
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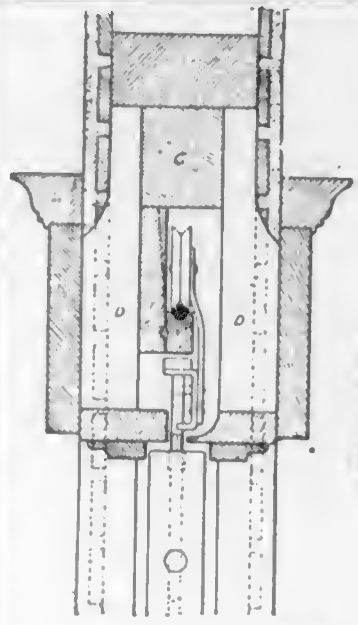

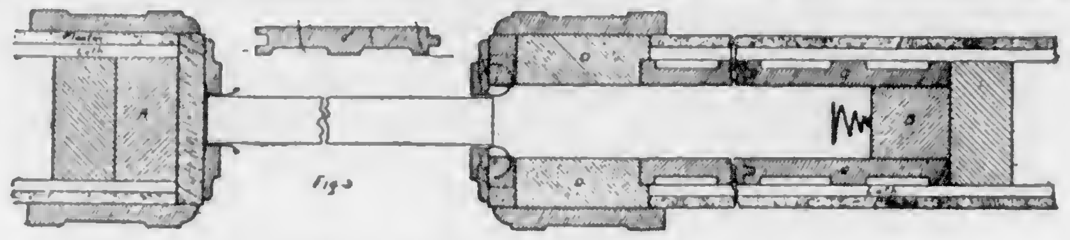

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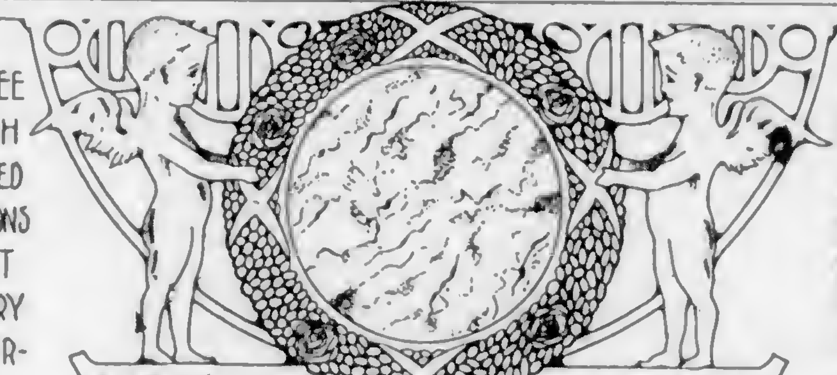

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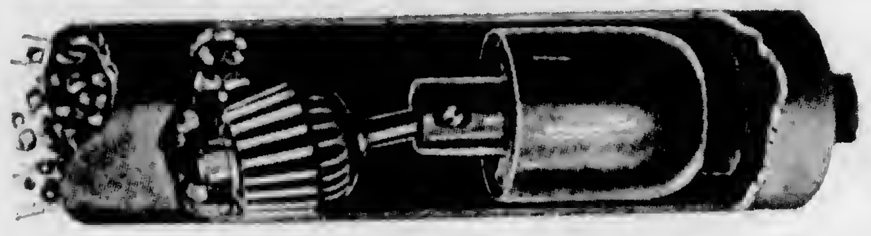

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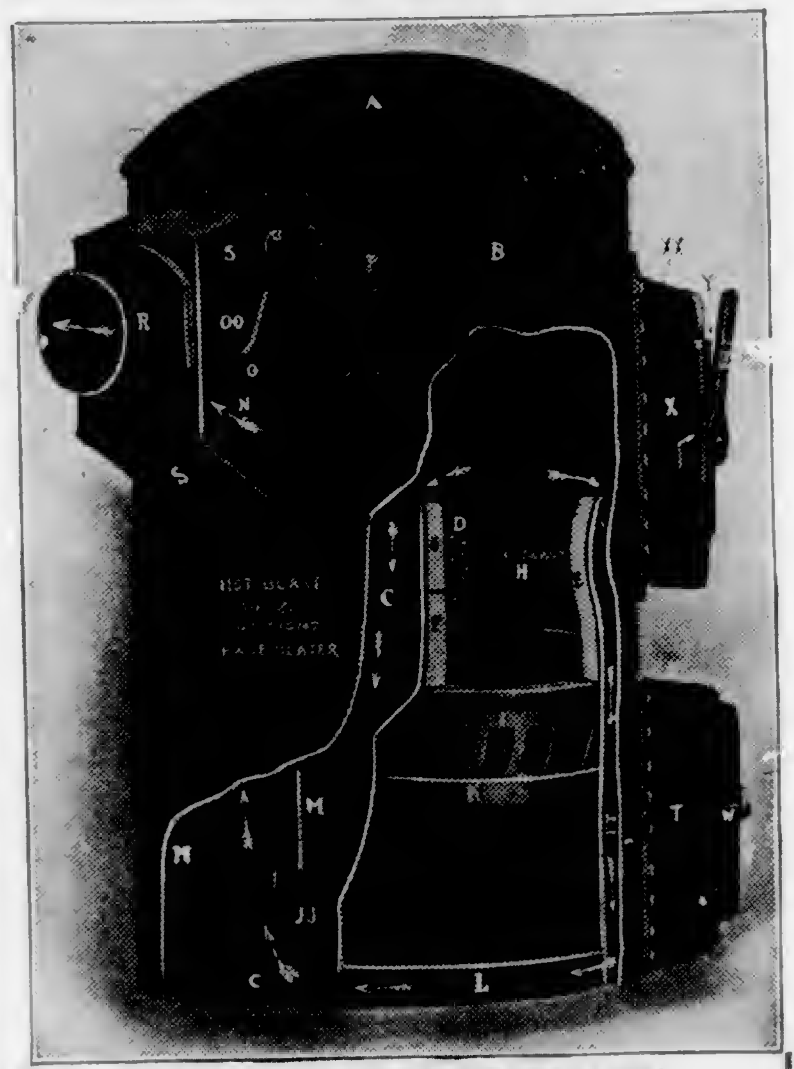

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While apparently the relationship between the master plumbers of San Francisco and the men in their employ is very friendly, the changes of conditions that have been taking place during the past year are bringing up questions that are irritating, to say the least, and in the near future new policies must be outlined to meet the needs of these changed conditions. One of the most important of these questions at the present time is that relating to apprentices, and during the past year the needs of proper regulations in this matter have become forcibly evident to all concerned in the business. At the time of the fire in 1906 this question was in a fair way of being settled, for the master plumbers and the journeymen's organization had united in a plan that promised to solve the question for all time. About a year before the fire they had commenced a campaign of education among apprentices, with an idea of weeding out all those whom they considered unfit to attempt to follow the trade. The boys, to the number of over five hundred, were examined in the common school branches and a record kept of their percentages. These examinations were held from time to time and those who proved deficient were informed that a failure to improve would result in their dismissal. The result was that the boys of inferior mentality gradually dropped out and those who were retained were given an incentive to improve. The inferior help was so thoroughly weeded out that at the time of the fire there were not more than twenty or twenty-five boys on the list waiting for employment, in place of one hundred or more, as was usually the case. After the disaster these conditions were soon changed. The demand for help was so crying that anyone who had a knowledge of tools and was willing to work found no difficulty in procuring a position. The apprentices began to realize their importance and in an effort to ape their fellow workmen formed a union of their own and the wage scale was boosted skyward. As long as conditions were in such a shape as they were then all was well, but the reaction has come now, and with it comes the belief that the exigencies of the abnormal days following the fire have given way to what must be business on a sound basis. The apprentices seem to fail to realize that the boom period is over and are inclined to follow along the lines laid down during the past two years. At the present time they are wondering why so many of their members are idle when work, on the

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whole, seems to be quite plentiful. The truth of the matter is that many of the master plumbers are refusing to hire apprentices at all, preferring to depend upon journeymen, or be allowed some choice in the matter of whom they may employ. During all this controversy, says Domestic Engineering, the non-union plumber is increasing his footing in San Francisco, and unless the union men are inclined to work along more fair and harmonious lines they will awaken some day to the fact that their services are not absolutely indispensable. During the past few years the trade schools have turned out a great many graduates, and, while these are lacking in experience, they have a training that is highly desirable and are picking up the experience in various ways. Practically all the repair work that is done here at the present time is done by non-union men, and the percentage of these who are starting shops of their own is increasing each day. The crying need at the present time is the education of apprentice plumbers so that they may become efficient and valuable workmen, and a system that will permit all those who wish to learn the trade to do so, providing they prove themselves adapted to that class of work. Just what the outcome will be is difficult to foresee, but there is no question but that some radical change will be made in the near future, as conditions are now in a very unsatisfactory shape.

To Complete Sacramento Church

St. Paul's Episcopal Church of Sacramento, work upon which was stopped over a year ago after about $25,000 had been expended, is now being completed by the contractors, J. Schroeder & Co., of San Francisco. It will require $15,000 additional to complete the edifice. Most of the work remaining to be done will be in the interior and roof.

Van Emon Offices Destroyed

In a fire which practically gutted the new Levy building on New Montgomery street, San Francisco, early in November, the Van Emon Elevator Company suffered loss to the extent of $5000. The company is now located at 46-54 Natoma street and the management deserves credit for getting settled again so quickly after being burned out. The new quarters, while not quite so pretentious, are comfortable and close in and will answer every purpose until other accommodations can be arranged.

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Contracts are being let for the construction of the Swift packing plants at Portland together with the machinery to be installed in the big establishment. Definite plans for the construction of the plant have been made, and specifications, blue prints and details have been prepared by the company's architects.

The main building will be six stories and will be 200 by 130 feet, with an annex of 130 by 75 feet. Its total cost will aggregate $500,000. Portland contractors are to be favored in the construction of the plant, provided other things to be taken into consideration are equal. Provided the bids received are unsatisfactory, however, the company reserves the right to reject all tenders and construct the plant itself. The main building is to be completed within one year. By the end of that time, it is expected four other large buildings and the stockyards will be ready for use. Plans are being made for these structures now. They are the glue factory, wool pullery, box factory and the engine-room.

Each of these buildings will be from 100 to 150 feet in length and will average about 100 feet in width. They will be two and three stories in height.

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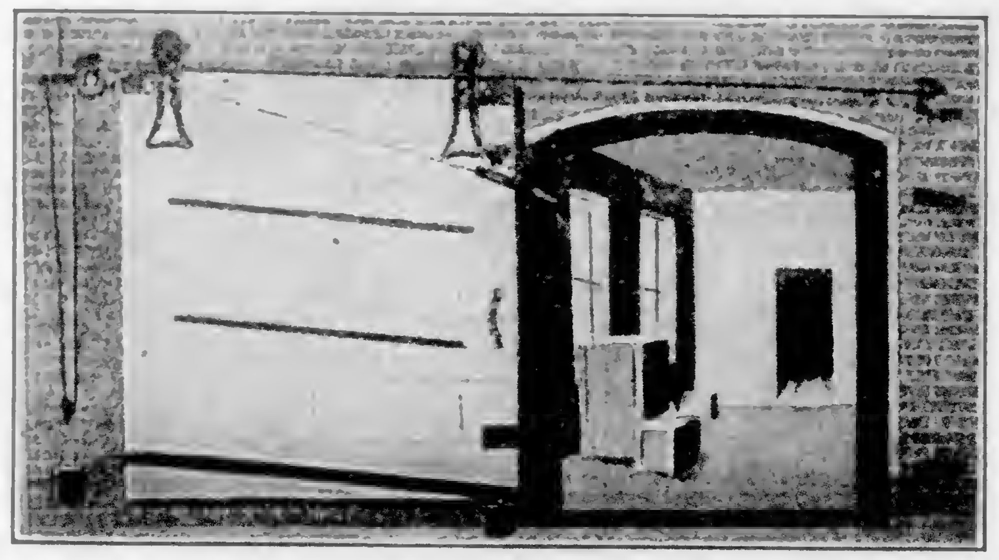

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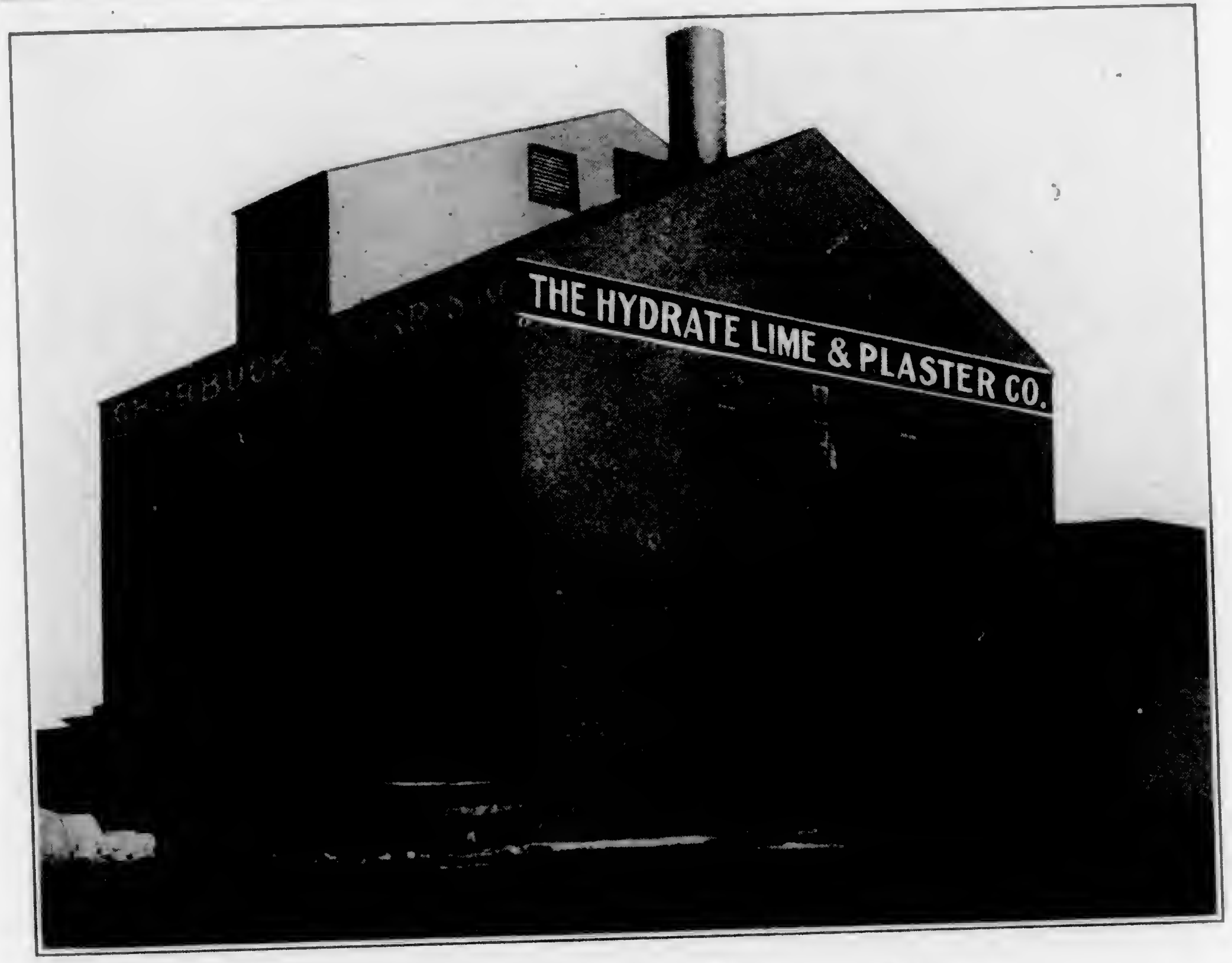


New Hydrate Lime Plant of Chubbuck & Harris, San Francisco

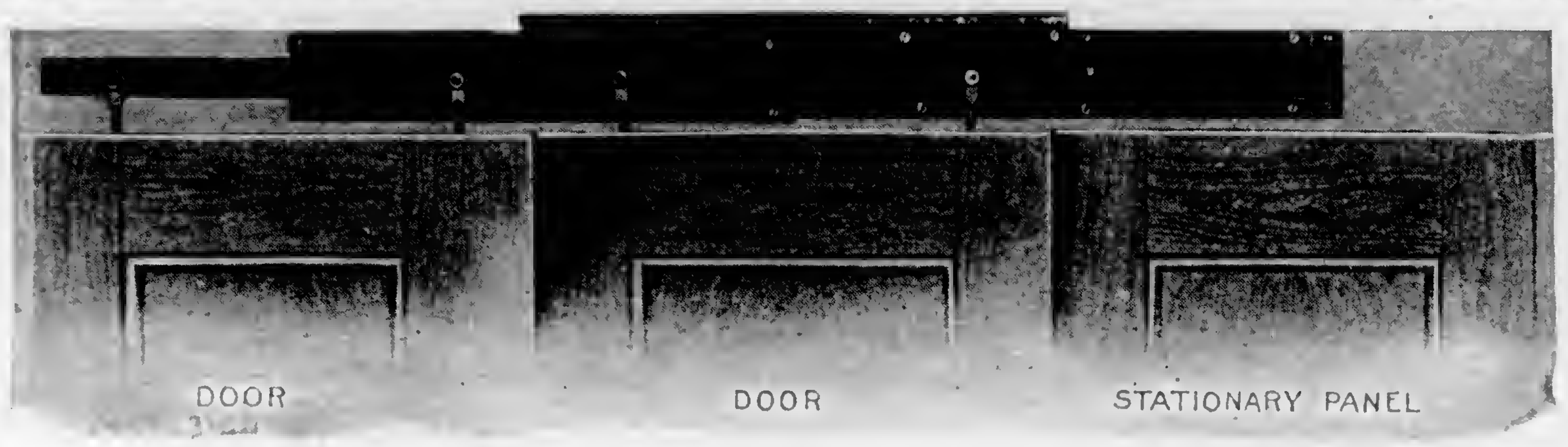
Hydrated Lime Plant for San Francisco

WITHIN the last two years hydrated lime, an improved and refined form of the common quick lime, has been placed upon the market and brought to the attention of the retail lime dealers. In Ohio and some of the other Eastern states, hydrated lime has almost entirely taken the place of lump lime, but in Wisconsin and the neighboring states, the proposition has come to the front only within the past few months and it is surely, if slowly, gaining ground.

The masons as a trade body are inclined to be prejudiced and to look with disfavor upon the use of new kinds of material.

The belief is common that hydrated lime is something new and therefore an experiment, but such is not the case. It is not a new discovery, but a rediscovery, for hydrated lime was in use in the old Roman times, and was crudely manufactured by piling up lump lime, covering it with sand in cone-shaped mounds, and leaving an opening at the top into which water was poured

Messrs. Chubbuck & Harris, well known San Francisco material men, realizing the bright future for hydrated lime, have built one of the most complete manufacturing plants on the Coast. It is situated close to the Southern Pacific tracks at the foot of Townsend street, San Francisco, and is also accessible by boat. The best machinery has been installed and the operation of the plant was begun this month with orders enough on hand to keep the wheels moving for a long time.



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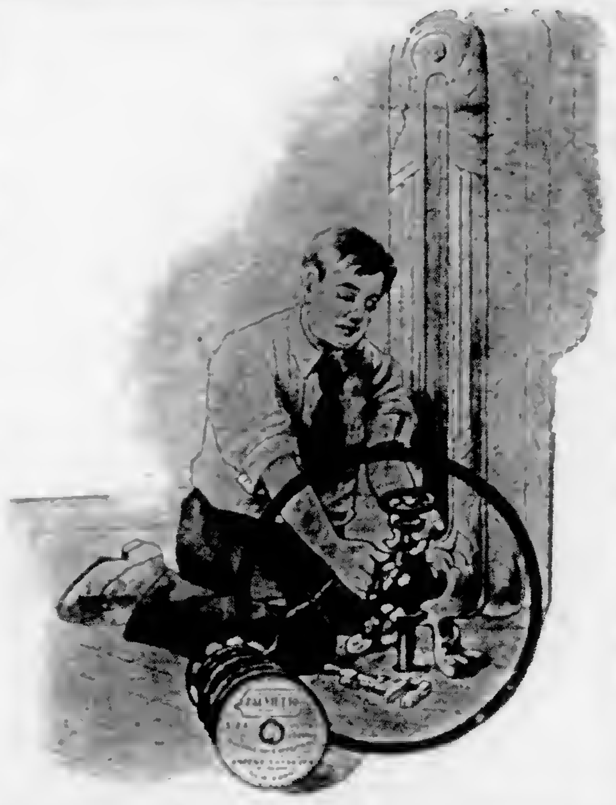

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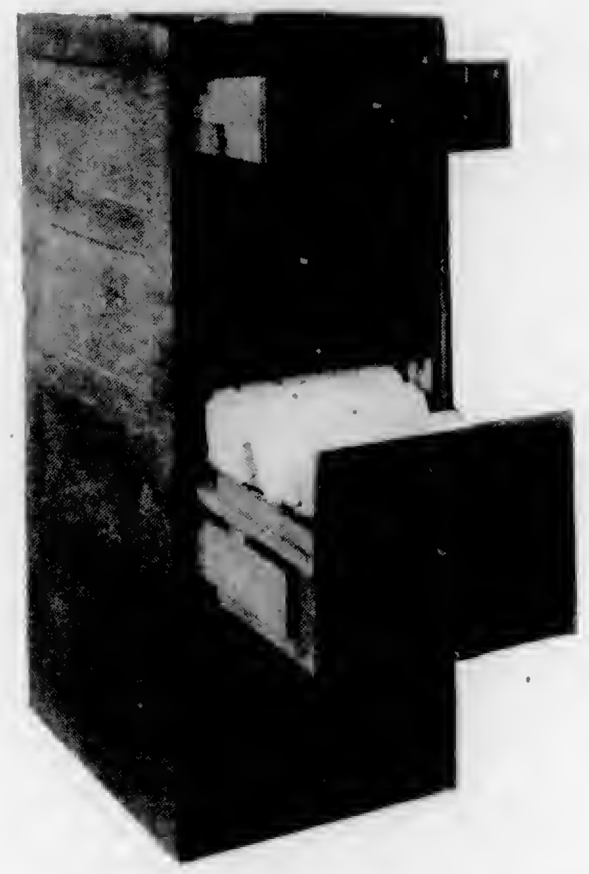
A Catalogue Filing System—or "Filing Catalogues"

Considerable discussion, pro and con, has appeared in recent numbers of the Architect and Engineer regarding the "catalogue nuisance," notably Mr. Wallingford's article in the July issue, and Mr. Requa's in the September number. The question of the convenient and "instantly at hand" filing of the catalogues continually received in the offices of architects, engineers and contractors, and the proper care of the great number of plans, specifications and blue prints handled, is one of vital interest and great importance to the profession and trade generally.

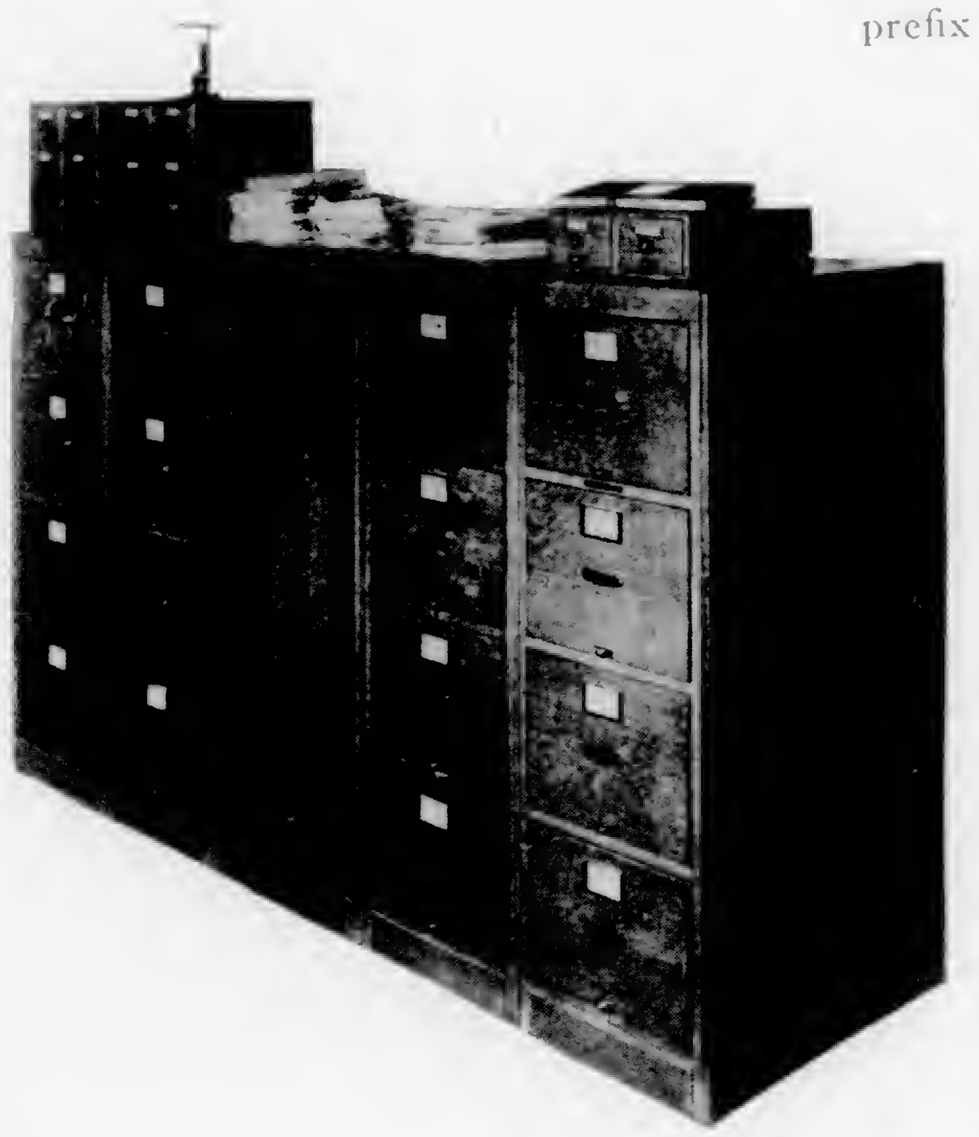
The crying need of some method or device that will overcome present difficulties is strongly felt by those who have occasion to keep at hand catalogues and who constantly handle plans, etc. Mr. Requa, in the above mentioned article, has happily described the solving of his troubles and has blazed the way for others by telling of the use of a vertical filing system, capable of indefinite extension.

Herewith are shown photographs of the catalogue and filing departments installed by the Library Bureau, 860 Mission street, San Francisco, in the offices of Architect John Galen Howard, San Francisco. The upper cut shows index and filing system for catalogues and price lists. The lower shows index and filing system for plans, specifications, blue prints, contracts and correspondence.



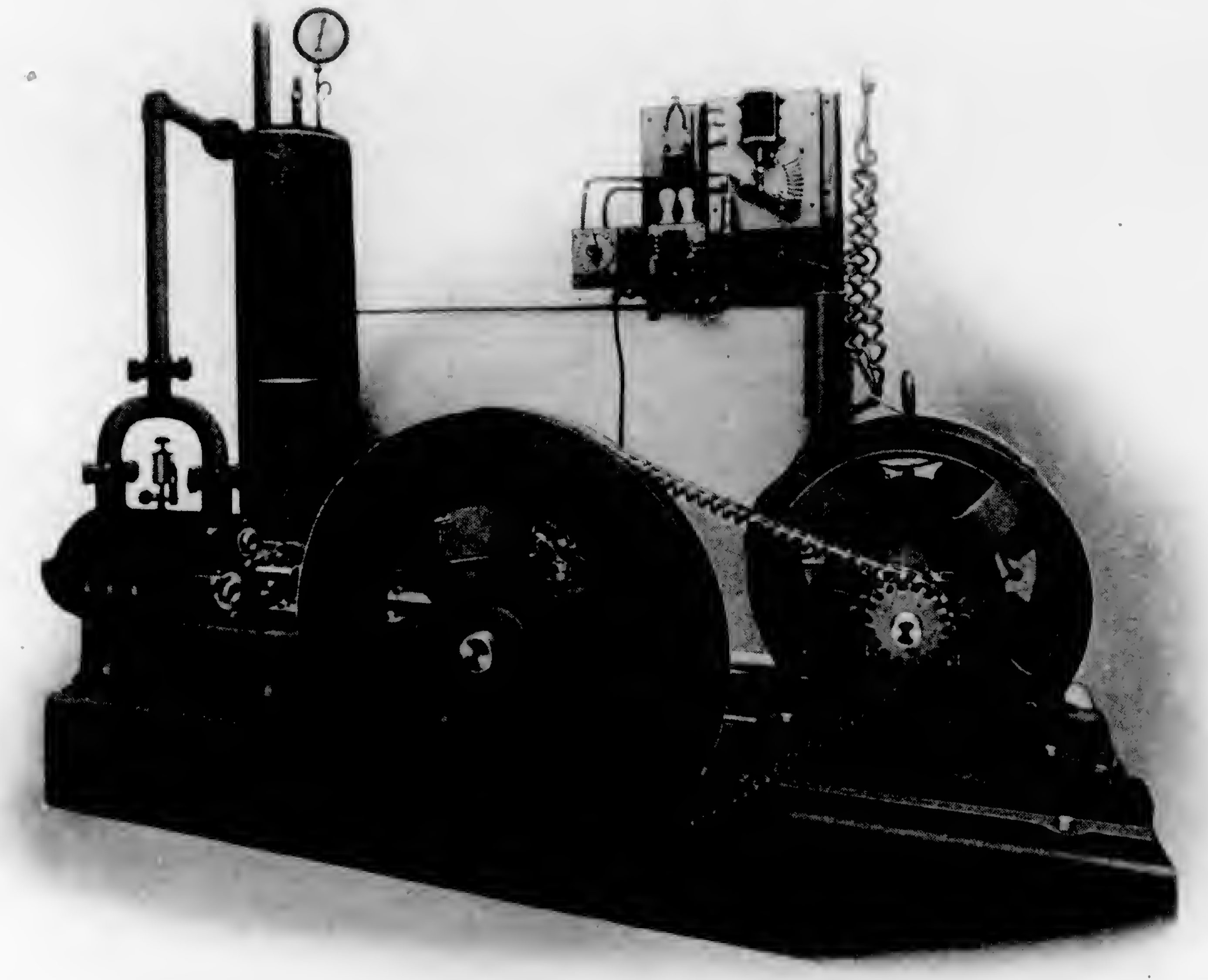
The catalogues are indexed by means of cards bearing names and addresses of manufacturers, together with the number by which catalogue can be instantly referred to in the vertical cabinet. As a cross reference a second card is written, bearing the name and class of goods, the name and address of manufacturer, and the reference number in filing cabinet. Both card indexes are arranged alphabetically. Correspondence, plans, specifications and blue prints are cross indexed similar to above and as instantly at hand, whether by name or subject matter.

The vertical files are carried in three sizes by the manufacturer for catalogue filing, to accommodate catalogues 8x10", 10x12" and 12x15". Catalogues are numbered for filing from No. 1 up, with the prefix "A," "B," or "C," according to size as above, placed in manila holders, and arranged numerically in the vertical file drawers. The same system of filing applies to correspondence, plans and specifications, etc.



Too much system is not used, for the whole operation is simple and easily kept up, and makes impossible the heterogeneous collection of catalogues which must be searched through and through for information, as this system provides subject and article index as well as manufacturer's name.

To quote Mr. Requa's previously mentioned letter, "No investment that has been made in this office has brought such large and quick returns in saving of time, labor and disposition, as has this vertical catalogue filing system."



Compressed Air for Office Buildings

The extent to which compressed air may be used to advantage in office buildings, is being realized by a number of our prominent architects, who have utilized this means to accomplish many desirable results.

Prominent among the many uses to which air may be applied, are airlifts for artesian wells and other sources of water supply, cleaning carpets, rattan seats, iron grille work, armatures and intricate machinery, cash carriers, sewage ejectors, elevators and elevator doors, physicians' spraying apparatus, pneumatic tubes for transmission of letters, small packages, etc., operating fuel oil burners, spraying in laundry work and other purposes which are not necessary to note in this article.

Compressors made by the Compressed Air Machinery Company, have been used in the construction and reconstruction of many of our largest buildings and at the present time, this company is installing a very complete air pumping plant at the new Southern Pacific hospital, corner Baker and Fell streets. The accompanying cuts show a recent installation of a pumping plant at the Alaska Commercial Company's building, which is discharging water 210 feet above the sidewalk from a well 145 feet deep, with fifty pounds air pressure.

It is well known that the ordinary deep well pump is a great consumer of steam and when any sand is present in the water, has to be frequently shut down, while pump rods and cylinder are withdrawn to renew cylinder lining and valve seats.

With the air system, the well may be sealed up, as there are no pump rods, cylinder or valves which have to be periodically drawn to the surface to make repairs.

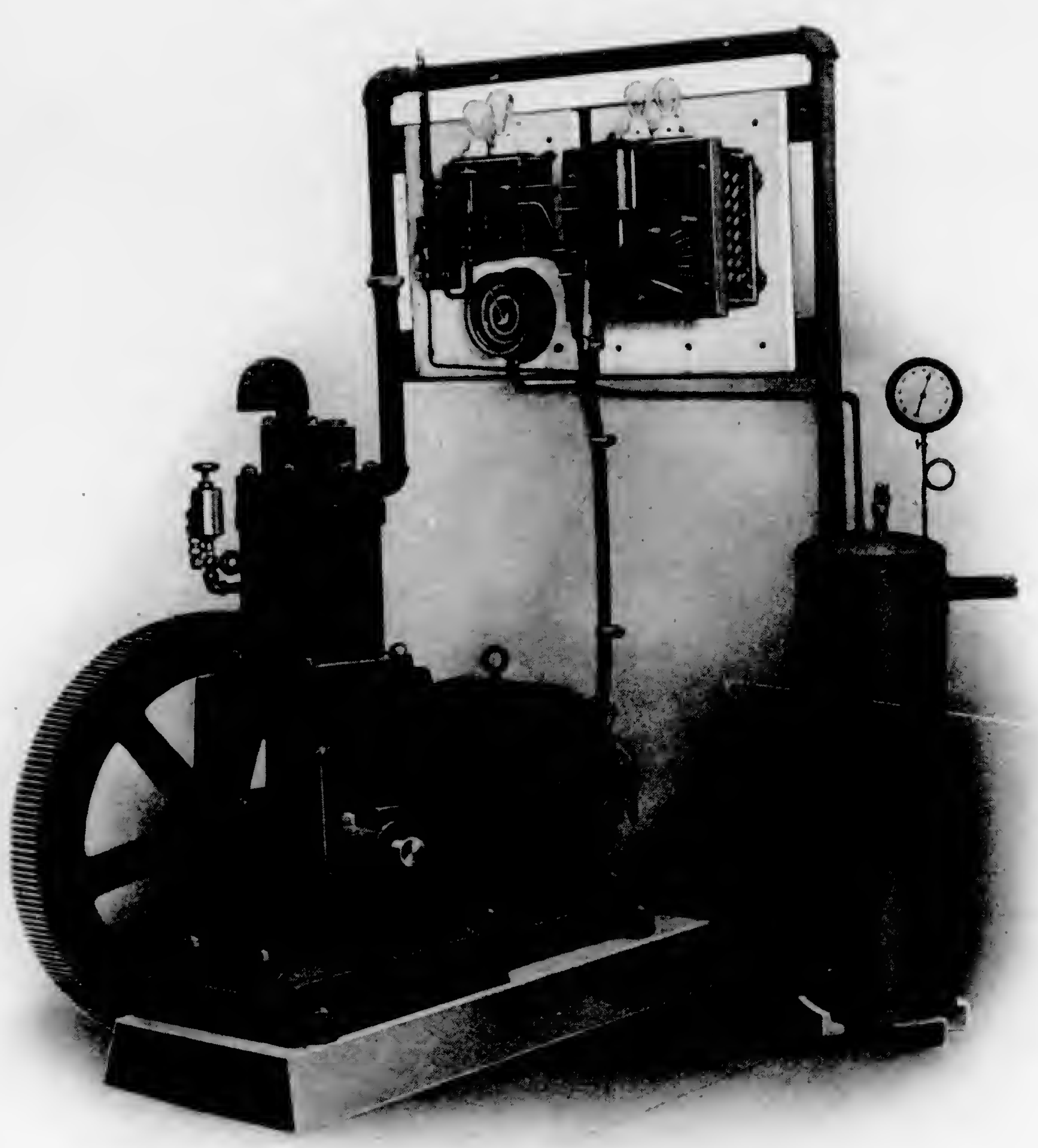
The discharge and air pipes are securely hung and remain without attention for many years.

This item alone, is a considerable saving of expense, to say nothing of the time lost while shut down. All moving parts of the system are in full view of attendant and fully accessible for inspection or necessary adjustment.

The smaller cut shows a typical compressor for supplying air at about forty pounds pressure for physicians' and dentists' use.

Connections are furnished in each room, and by providing outlets at convenient locations in hallways, pressure is always available for cleaning, blowing out basin traps, etc.

The compressor is automatically controlled from a pressure tank, and runs



only when necessary to renew the air drawn from the system. This machine is a very simple affair and constructed on such substantial lines, that one hundred pounds pressure may be used if desired. These compressors are usually directly geared to a motor, but may be driven by a belt or silent chain drive if preferred.

The California Market has just installed a belted compressor to supply air to operate their hydro-pneumatic elevators, and to use about the market for cleaning purposes.

The Compressed Air Machinery Company have unusual facilities for building compressors of any capacity and for any purpose. Their shop is equipped with latest machinery, especially selected for the production of their class of work. This enables them to compete with the Eastern products on very favorable terms, as time of delivery usually is a large factor in the sale of this kind of machinery. Repairs for all parts of their compressors are constantly kept in stock, which insures that anyone using their machinery, will not be subject to a long shut-down as the result of some unforeseen accident.

All their machinery is thoroughly tested under pressure before shipment and is guaranteed to be superior to other makes in their mechanical features and economy of operation.

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Material Inspections

To make sure of getting the right quality of material to fill their requirements, and to make sure that the material is in proper form for use, are matters of supreme importance to architect, engineer, contractor and owner. Assurance as to quality and form is infinitely more necessary in modern practice and under modern conditions, than it was in the years gone by. As to the quality of timber, brick and stone, the building materials of the old days, it was a matter that could be fairly determined by mere appearance, or at the most by very simple tests made with saw and hammer, and the scratching and framing, were done on the job. The building of the great structures of today is another matter. Steel and Portland Cement have largely replaced the old materials, and the quality of steel and Portland Cement cannot be so simply determined. The appearance of steel tells us almost nothing, and the appearance of Portland Cement absolutely nothing as to quality and availability for the purposes for which they are required. These questions must be determined by experts with special knowledge, and they involve the use of special apparatus. Necessity has brought into existence a body of specialists, engineers, chemists and physical laboratory men who confine their labors to just this line of indispensable work. They analyze and test steel, iron, copper, timber, cementing materials, stone, brick, paints, preservatives, both natural and manufactured materials of every form and description, and they afford invaluable protection to wise and careful purchasers of all these things.

In furtherance of their highly valuable service, to insure uniformity of tests and methods, there were organized a number of years ago, The American Society for Testing Materials, and also the International Society for Testing Materials, the latter association covering the field of both Europe and America. These bodies work practically in unison, and their standards are now accepted the world over.

Interior View of Fred Nichols' Fireproof Metal Door and Window Factory, Oakland, Showing Novel Use of Automobile to Run the Machinery in the Absence of the Regular Motive Power.

Among the very first of the firms of Inspecting Engineers and Chemists to organize in the United States, was that of Robert W. Hunt & Company, to whose advertisement on this page of this number we take pleasure in directing the attention of the readers of The Architect and Engineer. Of the very highest character, and with an international reputation to sustain, Robert W. Hunt & Company may be relied upon to render a service that is painstaking, accurate, prompt, and in every way reliable. The firm has been in existence for twenty years, and in that time it has served clients all over the world, and the volume of its work has been enormous.

Its San Francisco office and laboratories are at 425 Washington street, opposite the new United States Custom House.

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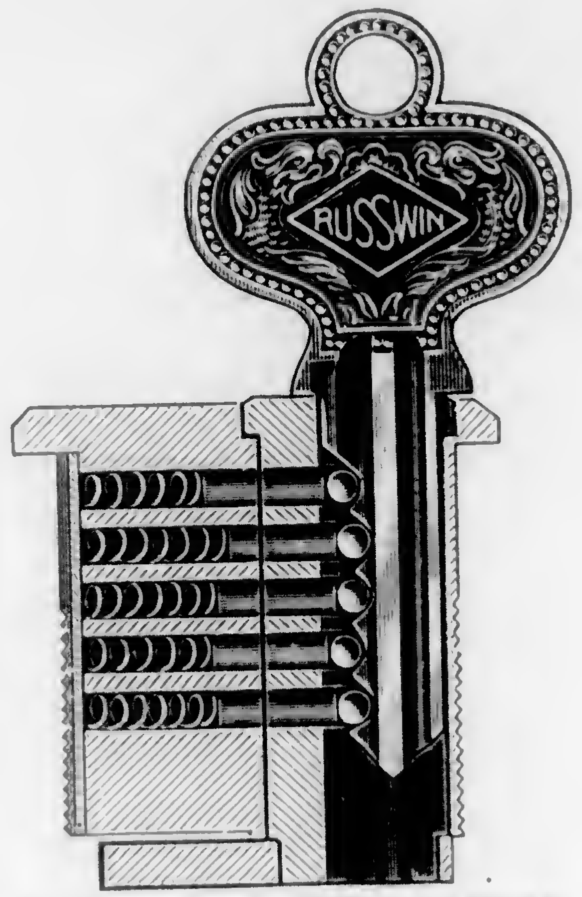
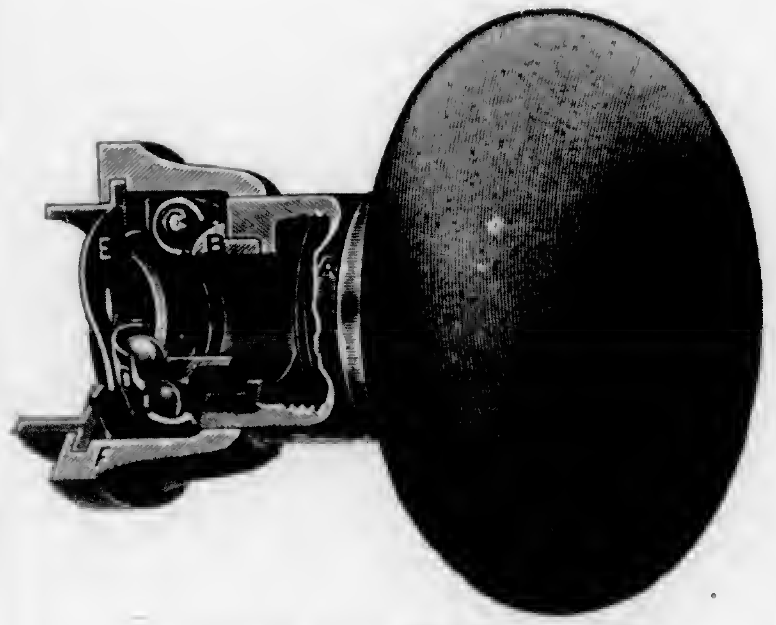


RUSSWIN BALL BEARING CYLINDER



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A SAMPLE TESTIMONIAL

SALEM, OREGON, March 10, 1908.

Gentlemen:—

This is to certify that the county of Marion has used Oregon Sienna Mineral Paint the past year for bridge work, and we are pleased to say that it has given entire satisfaction in every respect. The steel bridge across the Willamette River at Salem was given one coat of your paint last year, and although the bridge had not been painted since it was built 16 years ago, the one coat filled the voids caused by rust, and it looks as if two coats of ordinary paint has been applied. The job looks remarkably well, and we take pleasure in recommending it to all who want a first class paint.

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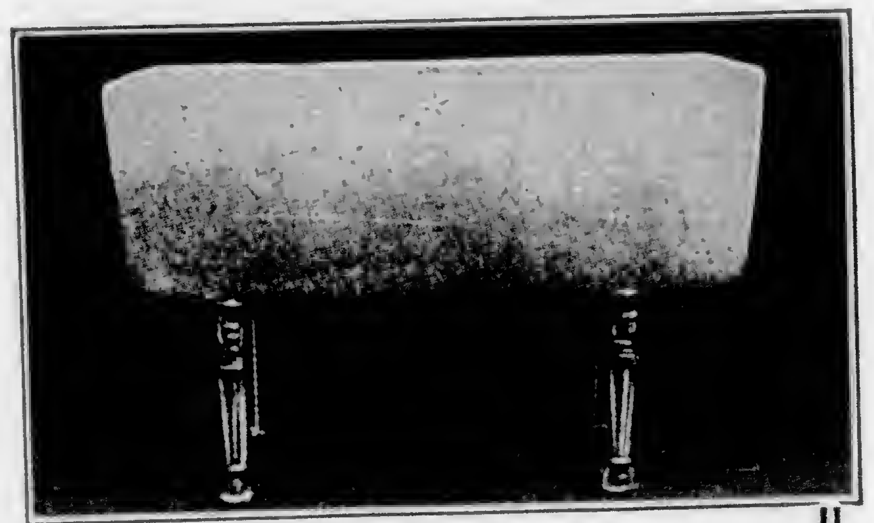

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Ransome Concrete Company Awarded Contract for Columbia Theater

San Francisco is to have in the new Columbia Theater, which will be located at the southwest corner of Geary and Mason streets, a playhouse which will be not only a credit to the city and its enterprising promoters but, moreover, the most magnificent and complete theater on the Pacific Coast. The general contract for the work has been let to the Ransome Concrete Company, with offices in the Crocker building, San Francisco. The completed cost of the theater with the chairs, curtains and interior furnishings will approximate $265,000.

The plans for the theater, which were prepared by Bliss & Faville, architects, show a structure which will be a monument to its designers and an ornament to the city. The facade of the building, which will be on Geary street, will be in polychrome terra cotta and pressed brick, the first story being set off by wide doors in massive masonry, from which rise fluted Corinthian columns. Figured mosaic panels will be set in the entablatures.

The building itself will be of strictly class A fireproof construction with steel frame structure, fireproofed with concrete. The interior will be strikingly treated in distinctively classic and dignified design, the plaster enrichments being specially ornate.

The theater will have a seating capacity of 1600 and will be well equipped with check rooms, smoking rooms, ladies' rooms, etc. The annex to the theater, running through to the Mason street front, is to be constructed of brick, and will provide space for dressing rooms, property rooms, storage of scenery, carpenter shop and the location of the mechanical plant necessary for the heating, ventilating and lighting of the theater.

The Ransome Concrete Company is under contract to complete the theater by about July 1, 1909. Work will be started at once.

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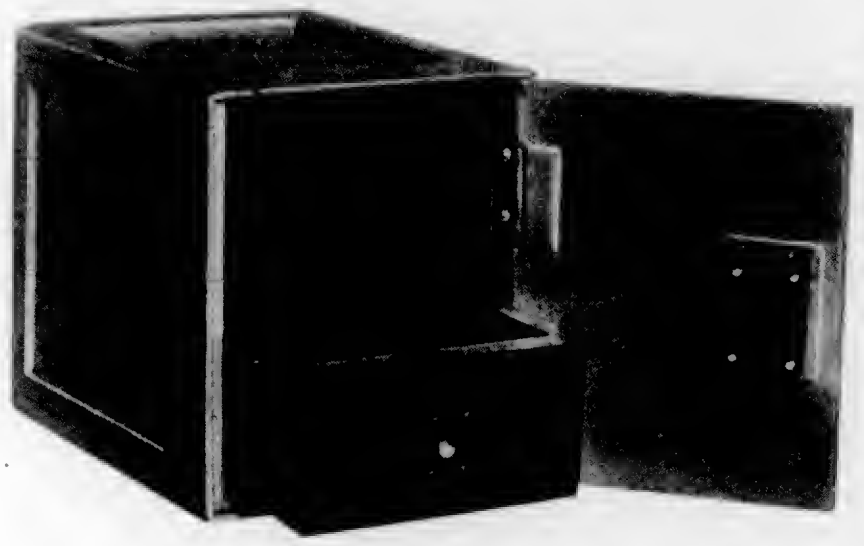

Safes for Apartment Houses and Residences.

The Parcells Safe Company is specializing in wall safes for hotels and apartment houses. These safes are built in the company's local factory and can be made any size. They can be built in houses already finished or the architect can provide space for them in his plans and specifications. They can be built at a cost of from $15 up. Of course the cheaper ones are not intended to be absolutely fireproof; their real purpose being a safeguard against sneak thieves and burglars. The Parcells Company also makes the regular fireproof safes with three-inch wall with combination lock and key lock. These can be readily installed in apartment houses and residences. Samples of these safes can be seen at the salesrooms of the Parcells Company, 577 Market street, San Francisco.

Golden Gate Brick Company

The Golden Gate Brick Company, whose factory is located at Antioch, and who make "Golden Gate Sandstone" brick out of sand and lime (no cement), have had a very successful year.

They have delivered a great many thousand brick to face the new Southern Pacific Railroad Company's hospital, which covers an entire block of land bounded by Hayes, Baker, Fell and Lyon streets, San Francisco. The brick work is about three-fourths finished and another wing will probably be added very shortly.

The Keystone apartment house, which is now being built at Washington and Hyde streets, will use about one-quarter of a million "Golden Gate Sandstone" brick with which to face the light wells. Oliver & Foulkes are the architects.

The Chabot building on Fremont street, of which W. D. Shea is the architect, is faced with "Golden Gate Sandstone" brick as well as the Brunn apartment house, C. H. Barrett, architect, at Bush and Hyde streets, and the Cordes building, A. L. Worswick, architect. The Hotel Argonaut on Fourth street, Righetti & Kuhl, architects, used over

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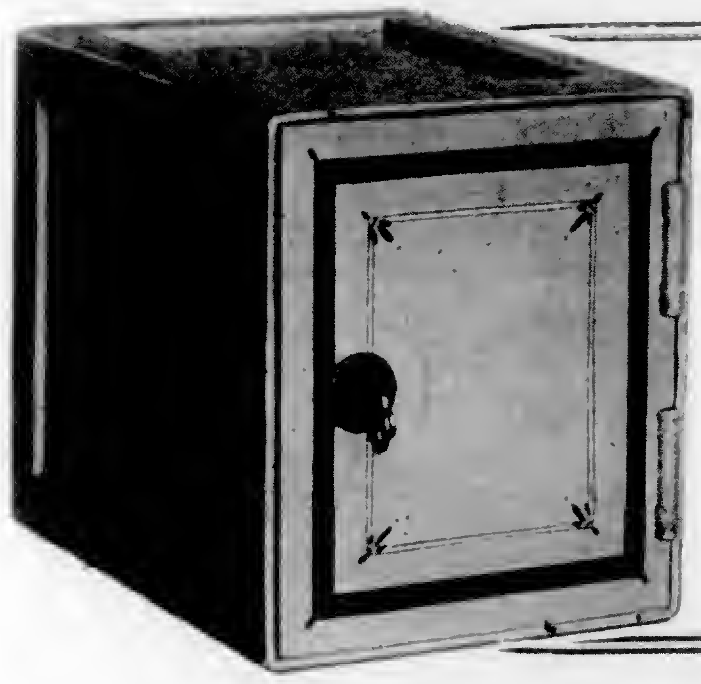

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The Skaller building, of which O'Brien Bros. are the architects, and which is situated on the southwest corner of Jackson and Stockton streets, is faced with "Golden Gate Sandstone" brick. The James-Force building, of which Edward Mathews and E. E. Childs are the architects, is located at Sacramento and Davis streets, and it is also faced with sand-lime brick from the Golden Gate Brick Company.

The Golden Gate Brick Company has had a great deal of work from the country towns. Quite a few school houses, especially in the San Joaquin valley, are being faced with their brick. Architect E. Mathewson of Fresno used them in the Tulare high school, as well as the Fowler grammar school. B. G. McDougall is facing the new grammar school at Lindsay with sand-lime brick from this factory. The same architect built the Merced city hall and engine house of "Golden Gate Sandstone" brick. The Carnegie library at Auburn, of which A. D. Fellows is the architect, is about finished and is faced with sand-lime brick from the above concern.

This list enumerates a few of the larger jobs and they have had a great many buildings in Chinatown and elsewhere.

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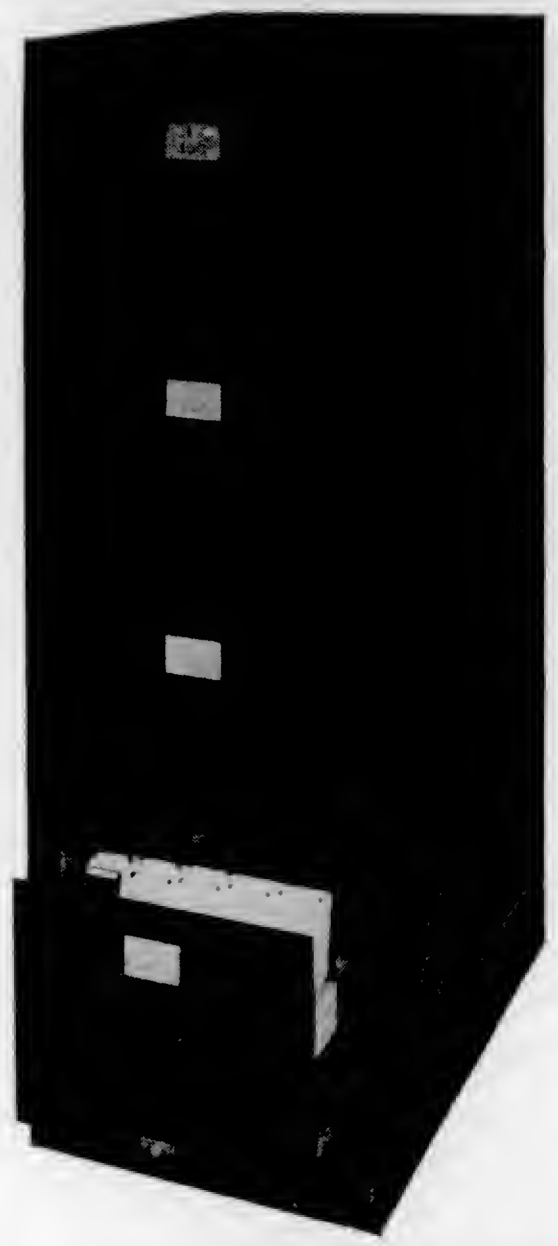

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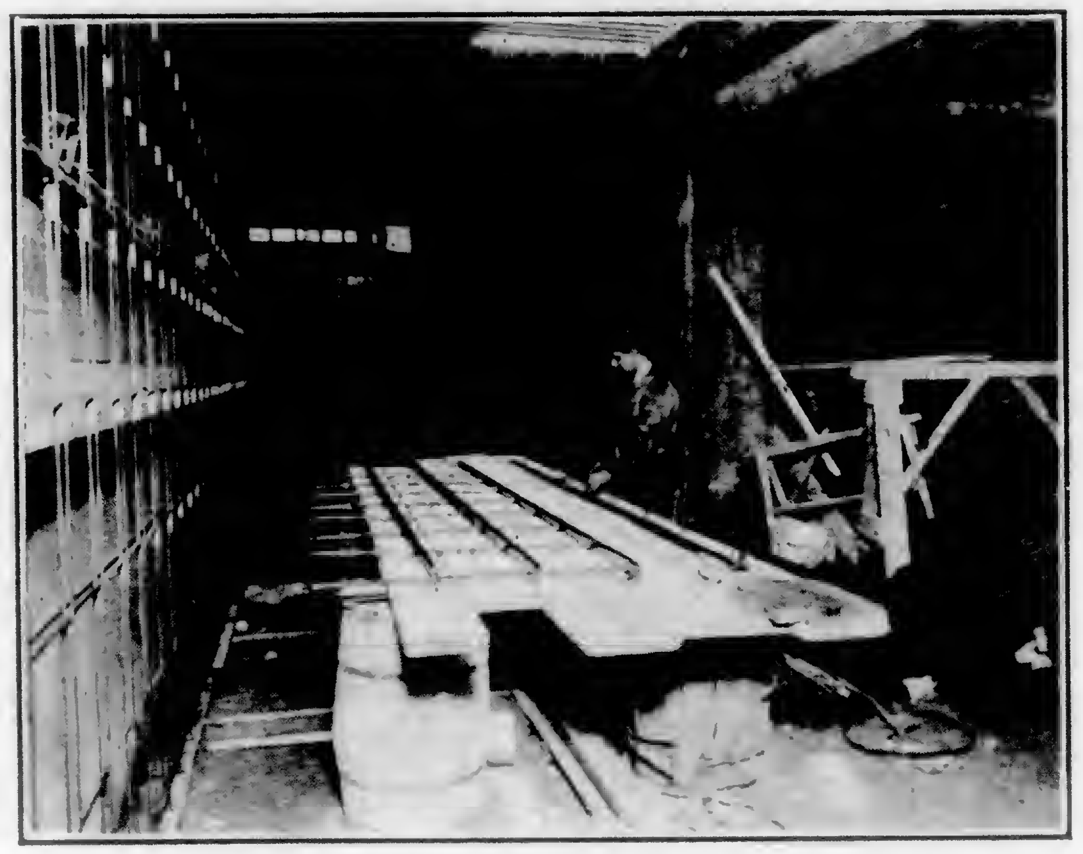

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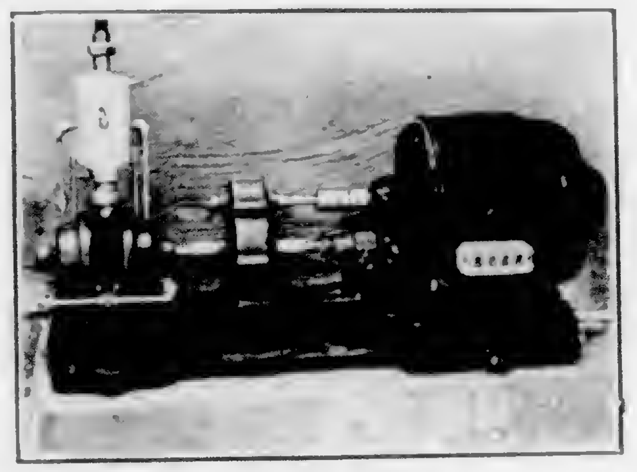

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Mr. Louis F. Horner, formerly of Santa Barbara, and for many years a resident there, is now associated with Wilbur David Cook of Los Angeles in the practice of landscape architecture. Mr. Horner is an eastern man and received his training there. He is thoroughly posted on the flora of California and understands local conditions, especially with reference to soil and climate. Mr. Horner will supervise all planting operations from Architect Cook's office.

National Association of Builders' Exchanges

The National Association of Builders' Exchanges will hold its next convention the first Tuesday in March, 1909, at the headquarters of the Building Trades Employers' Association in The Builders' Exchange, 29 to 35 West Thirty-second street, New York City.

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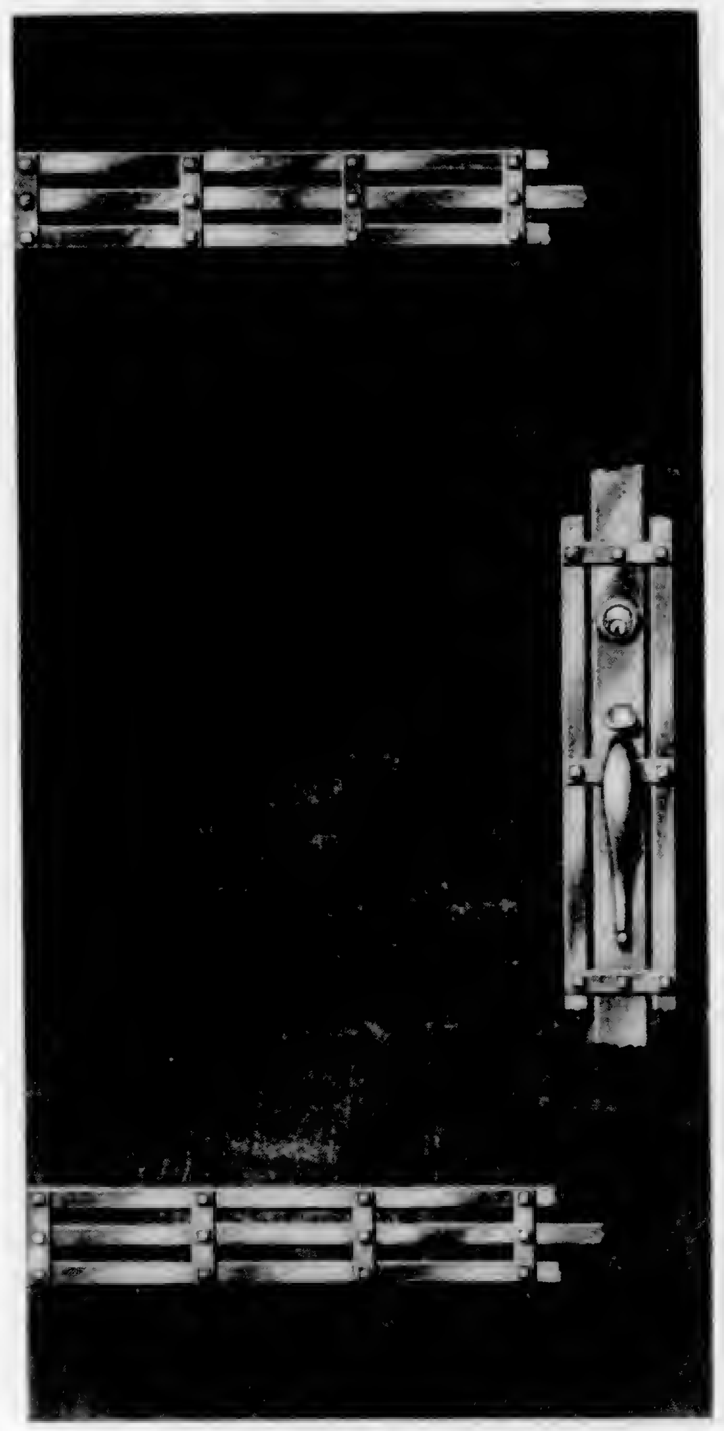

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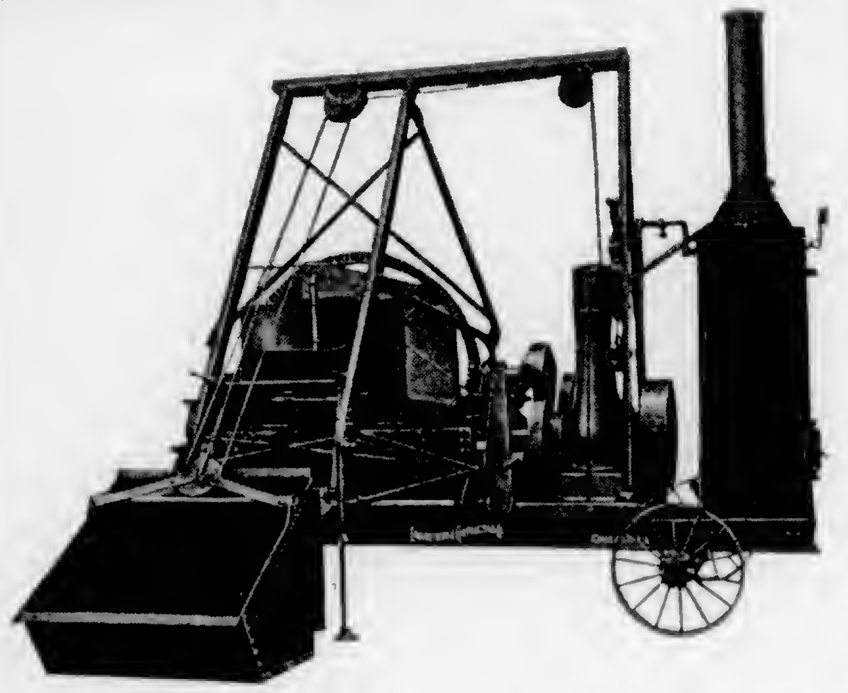

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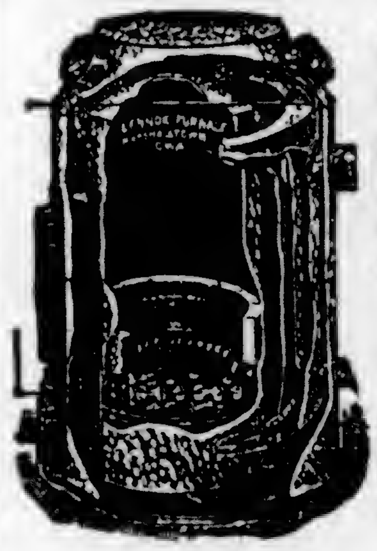

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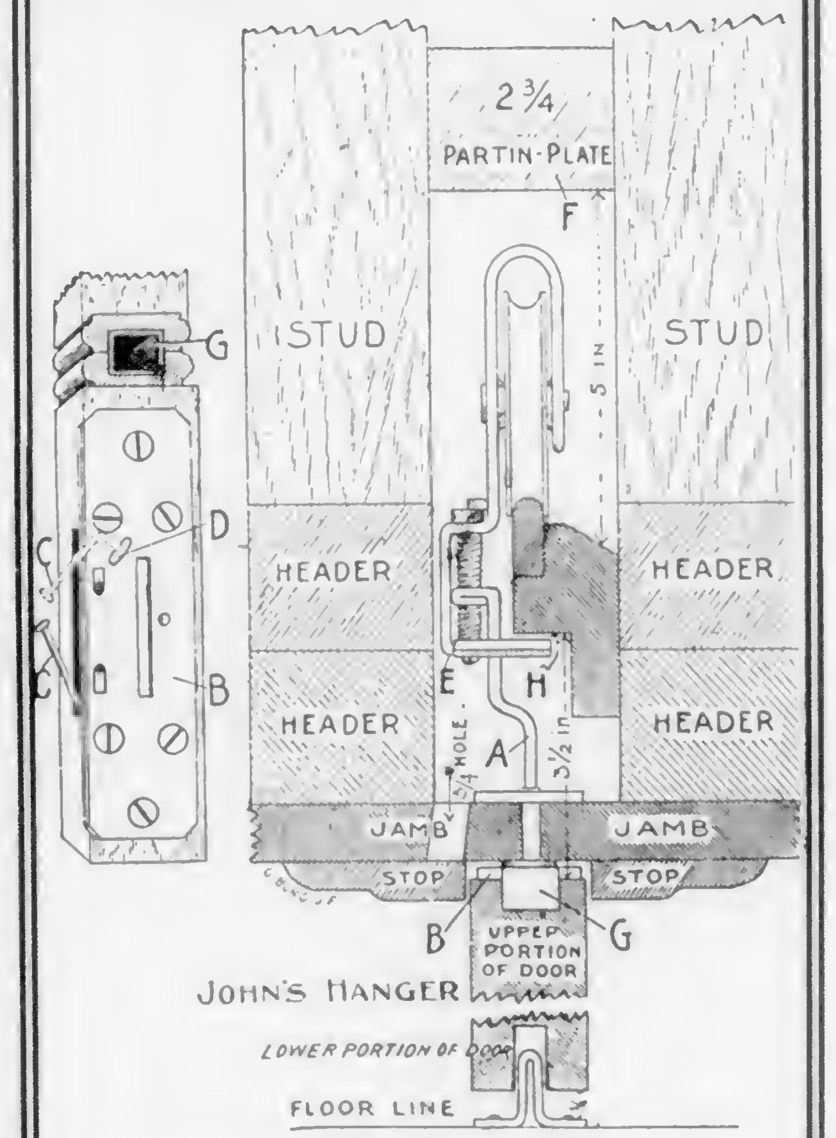

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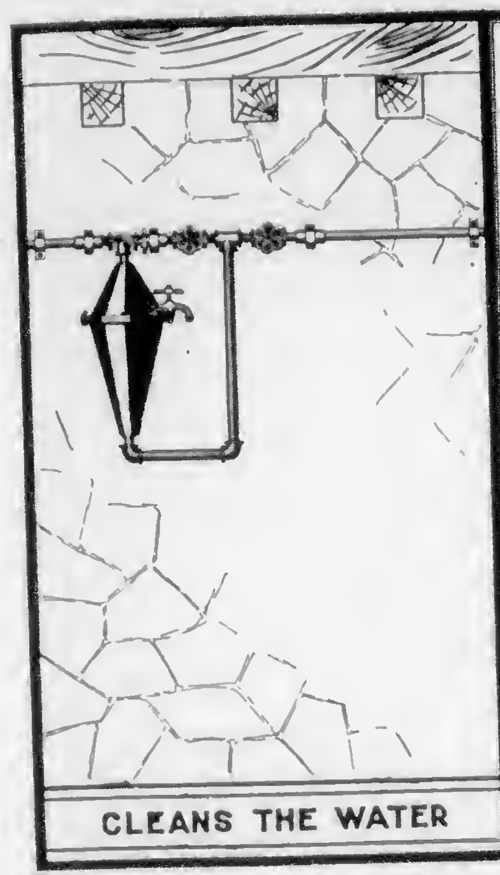

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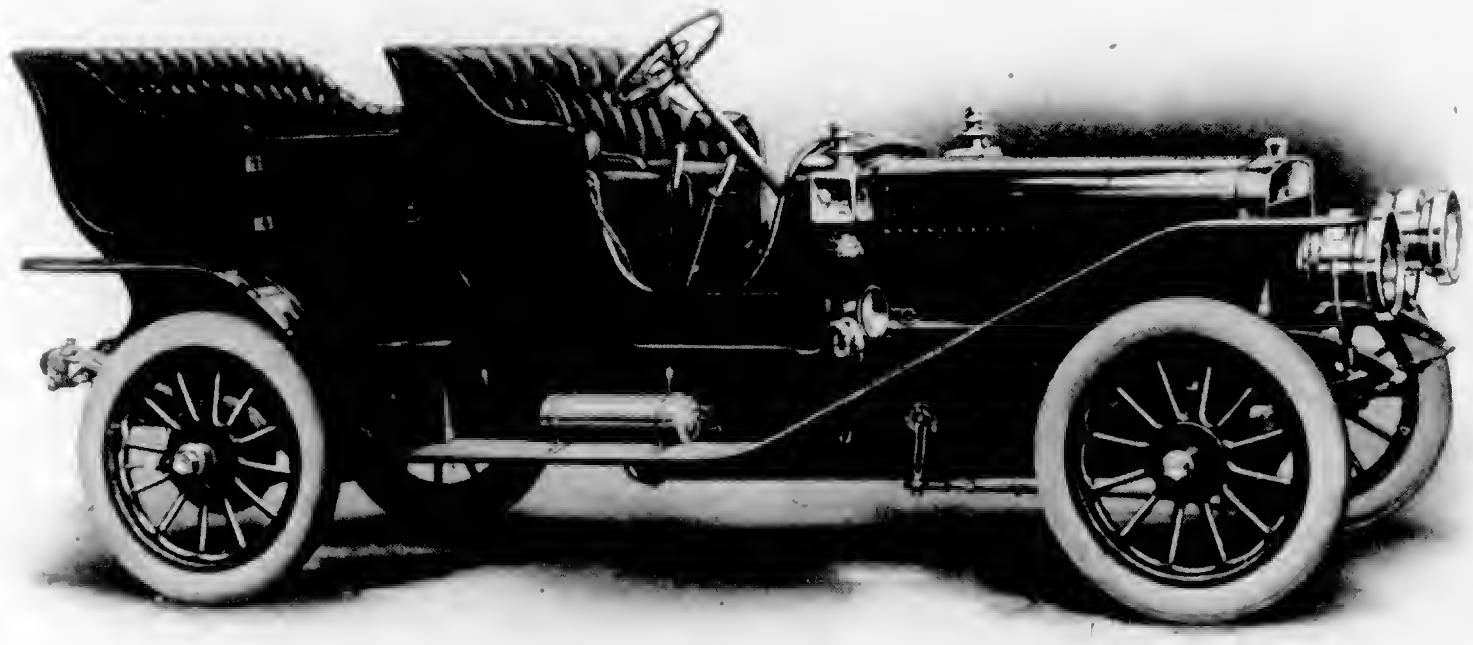

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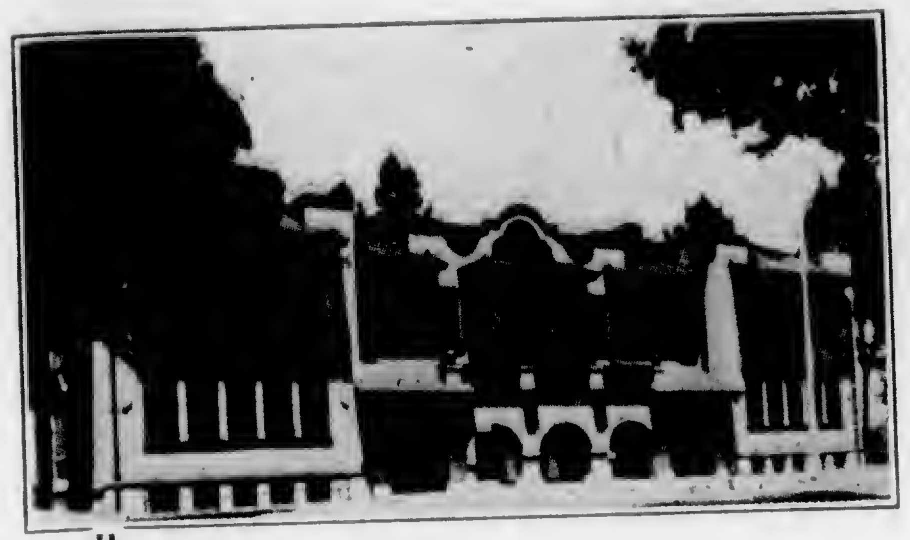

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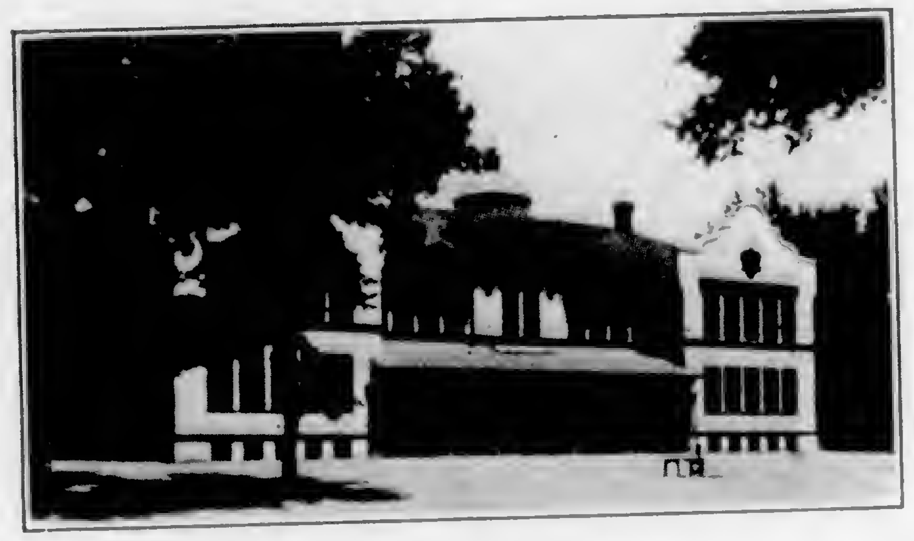

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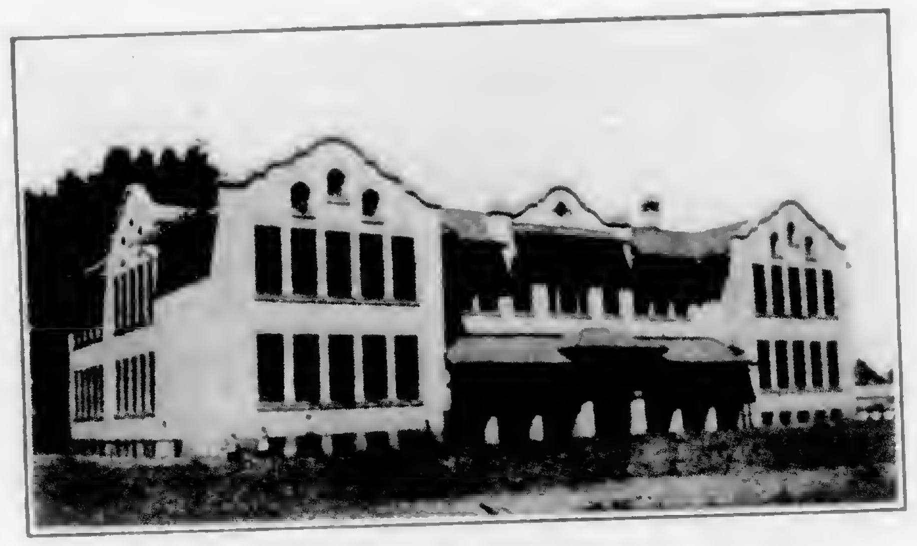

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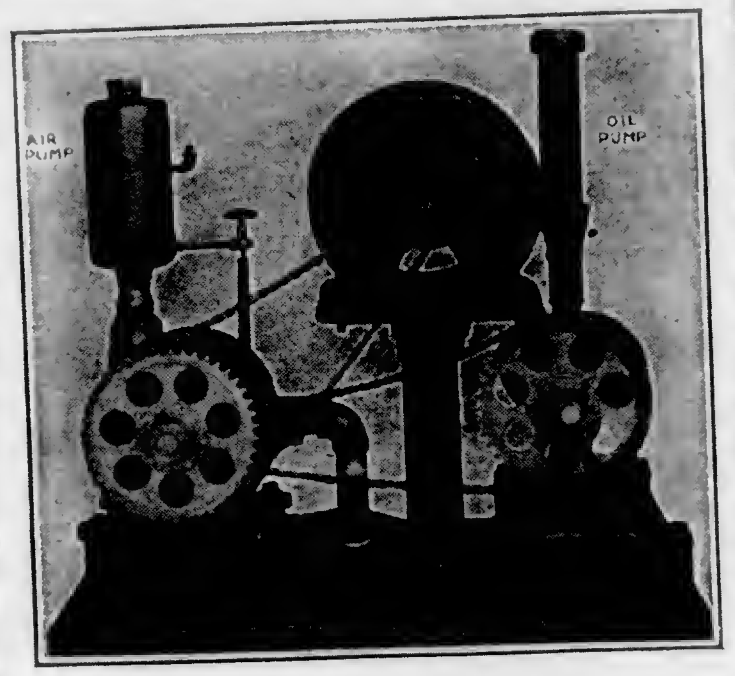

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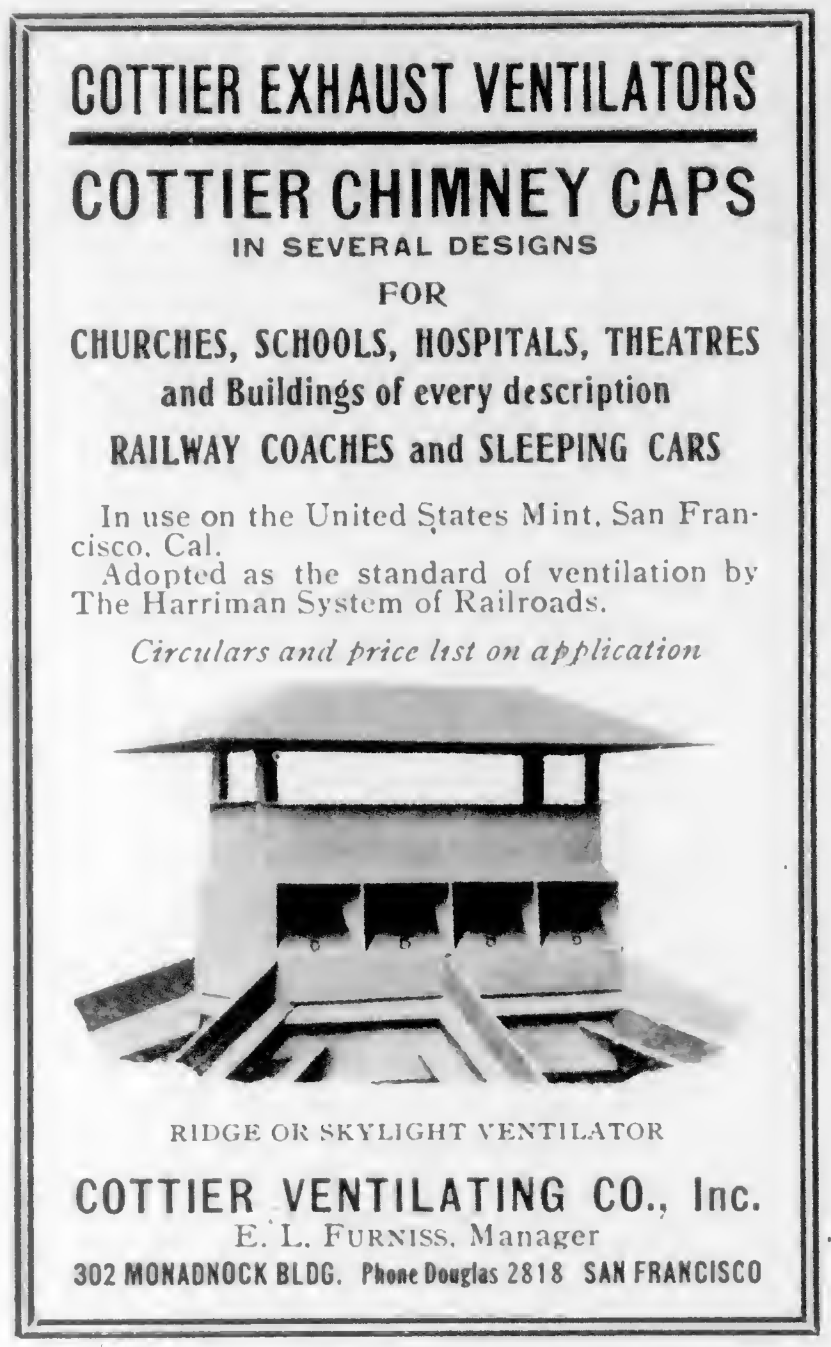

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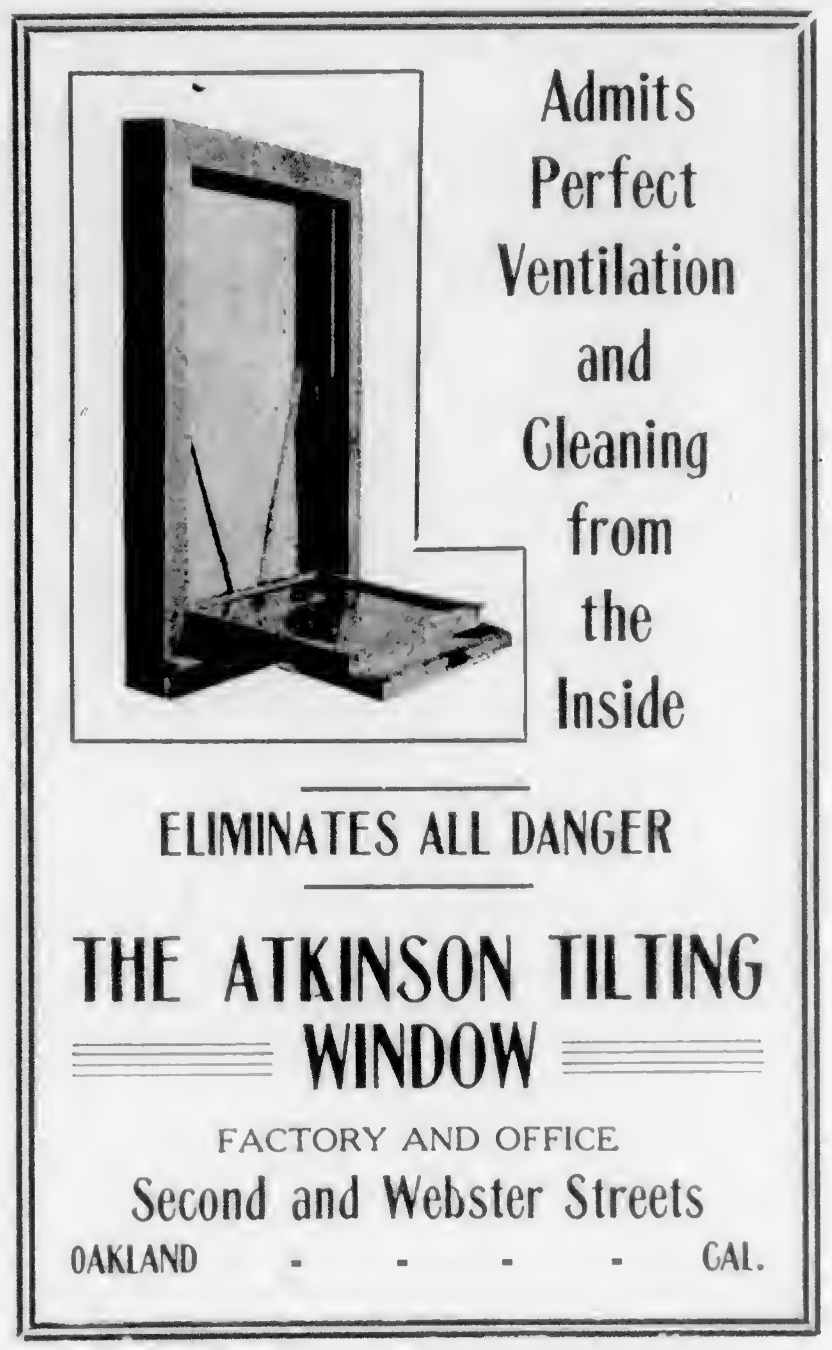

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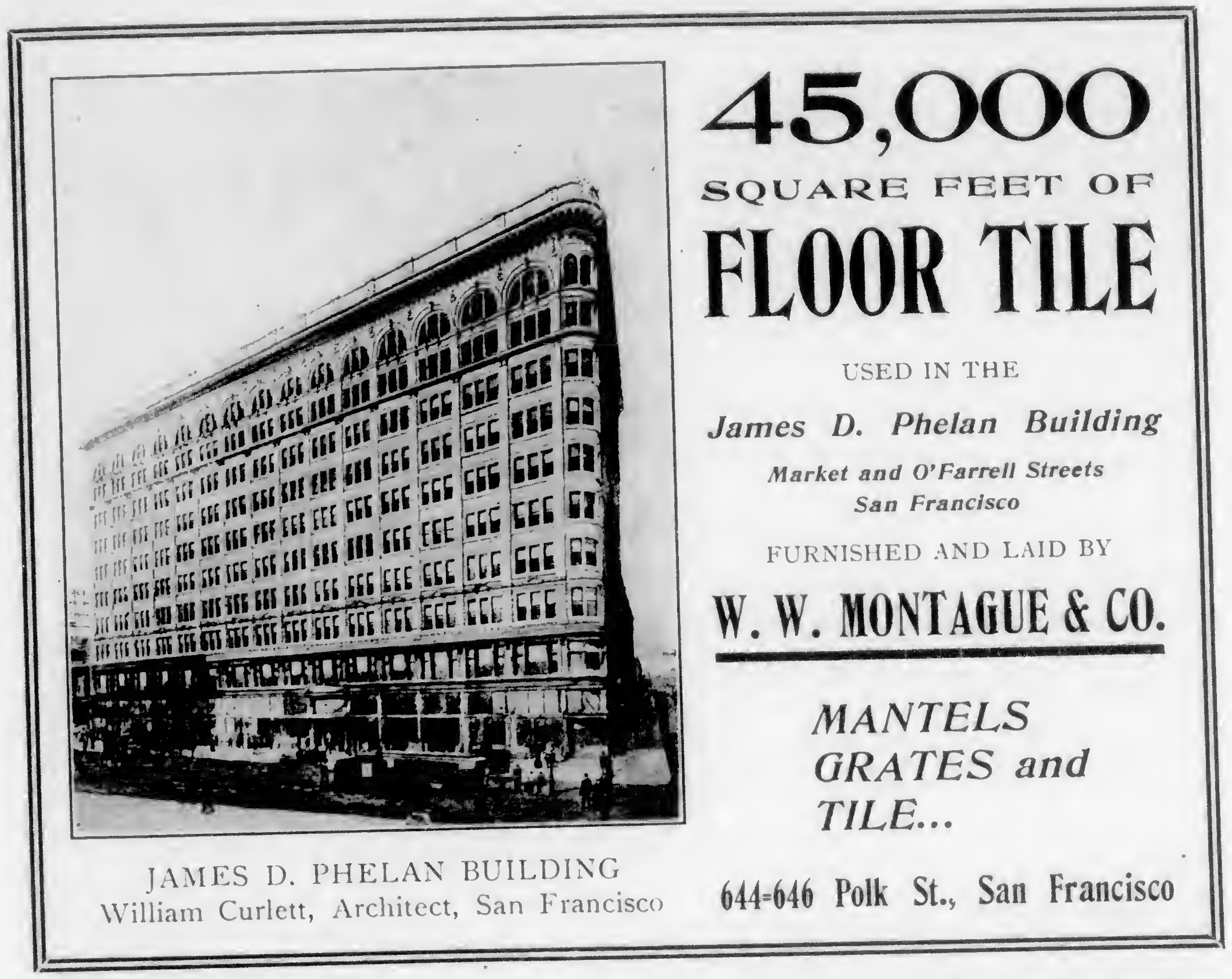

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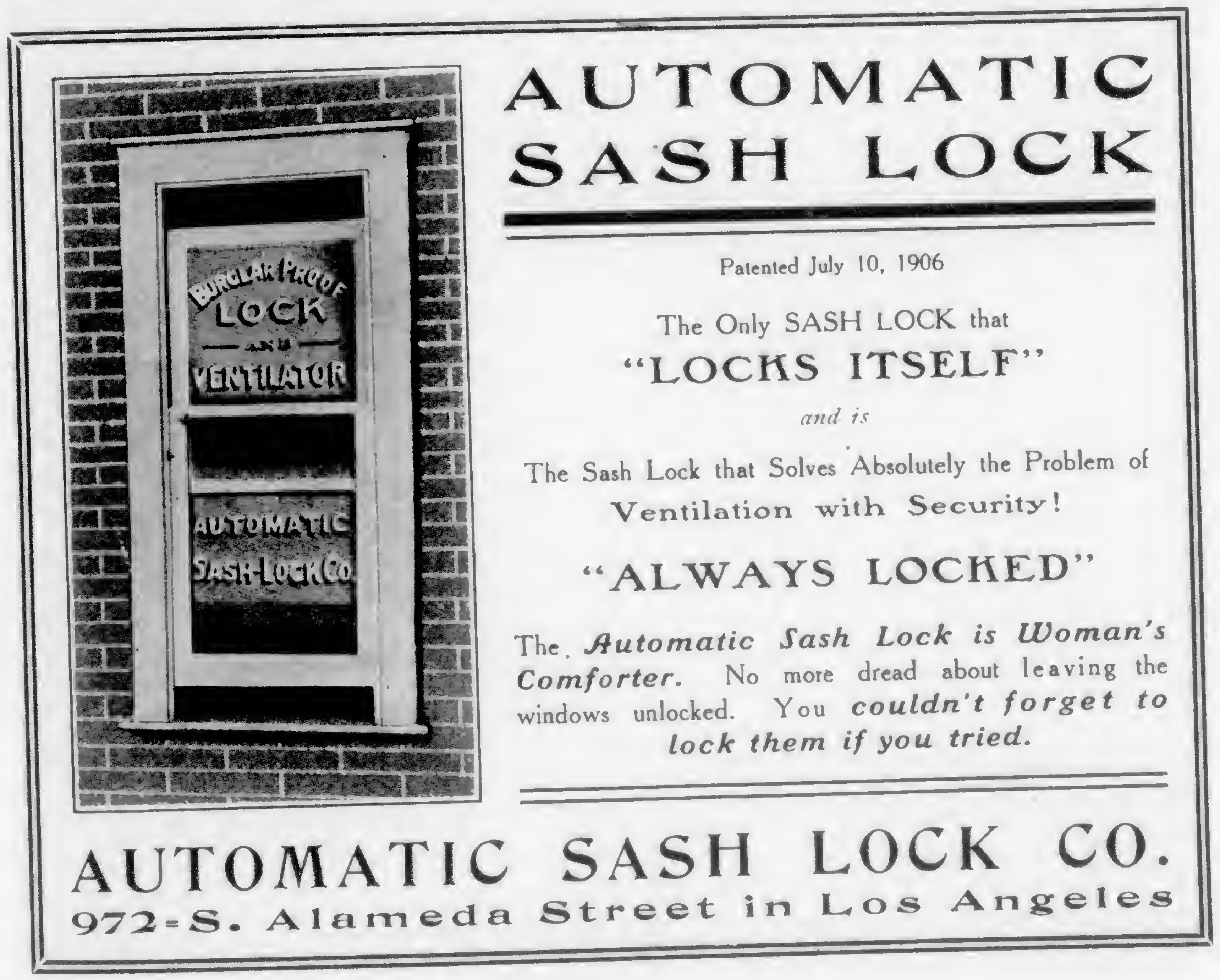

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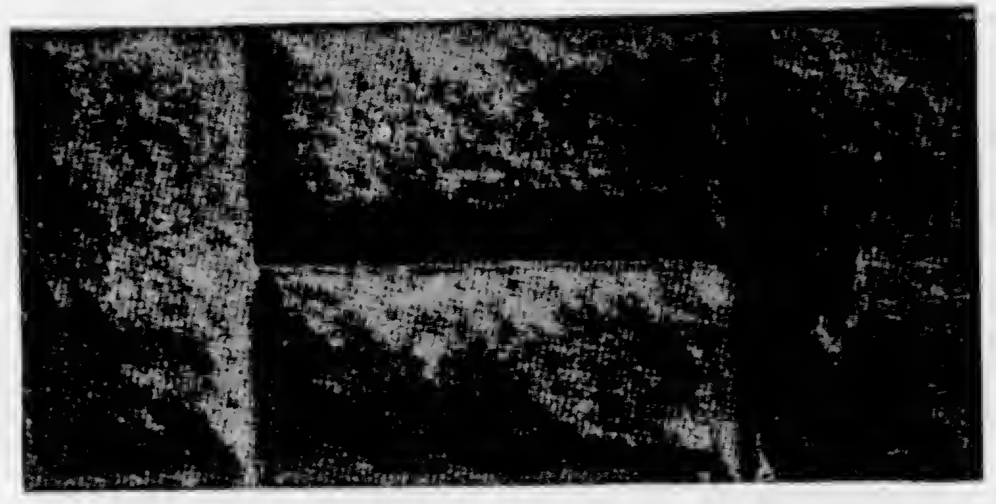

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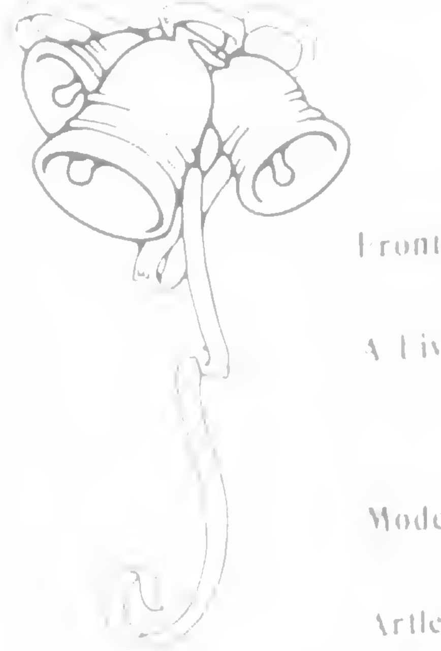

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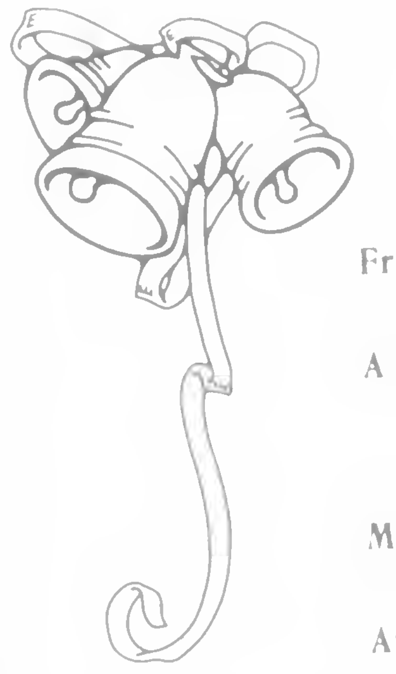

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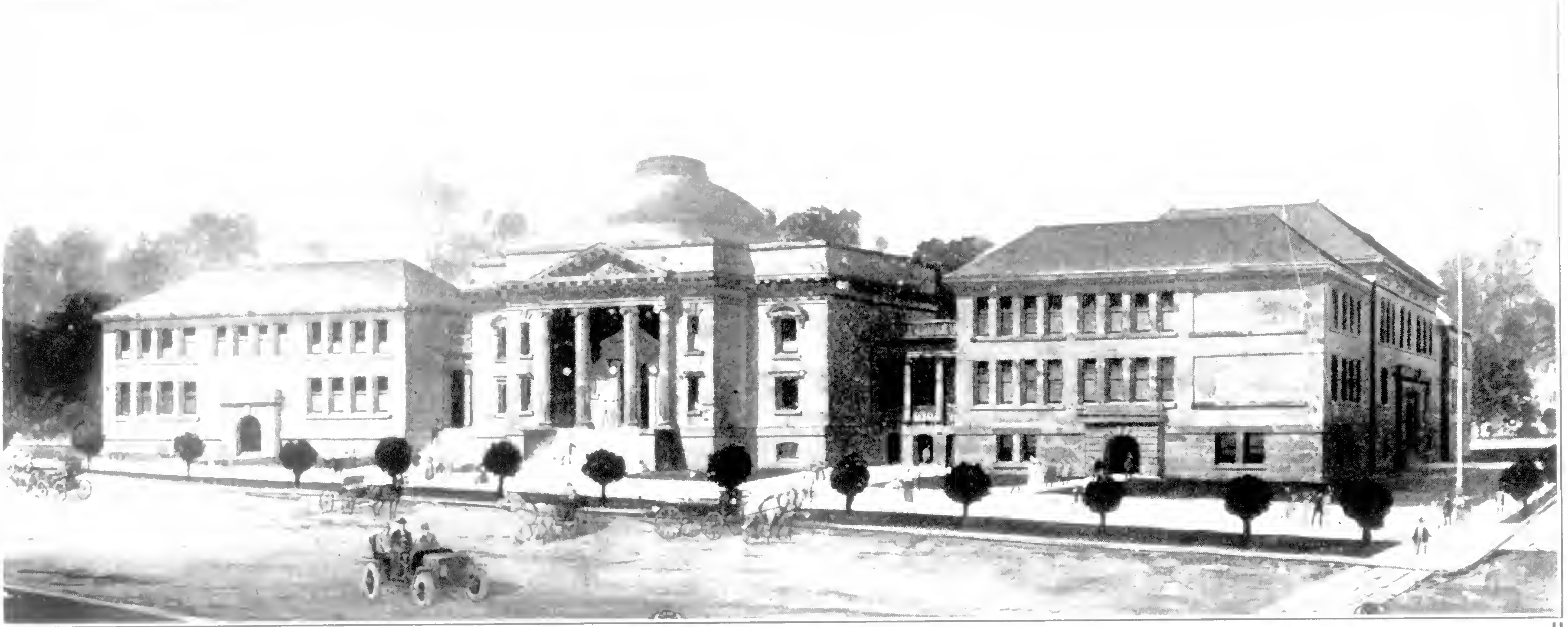

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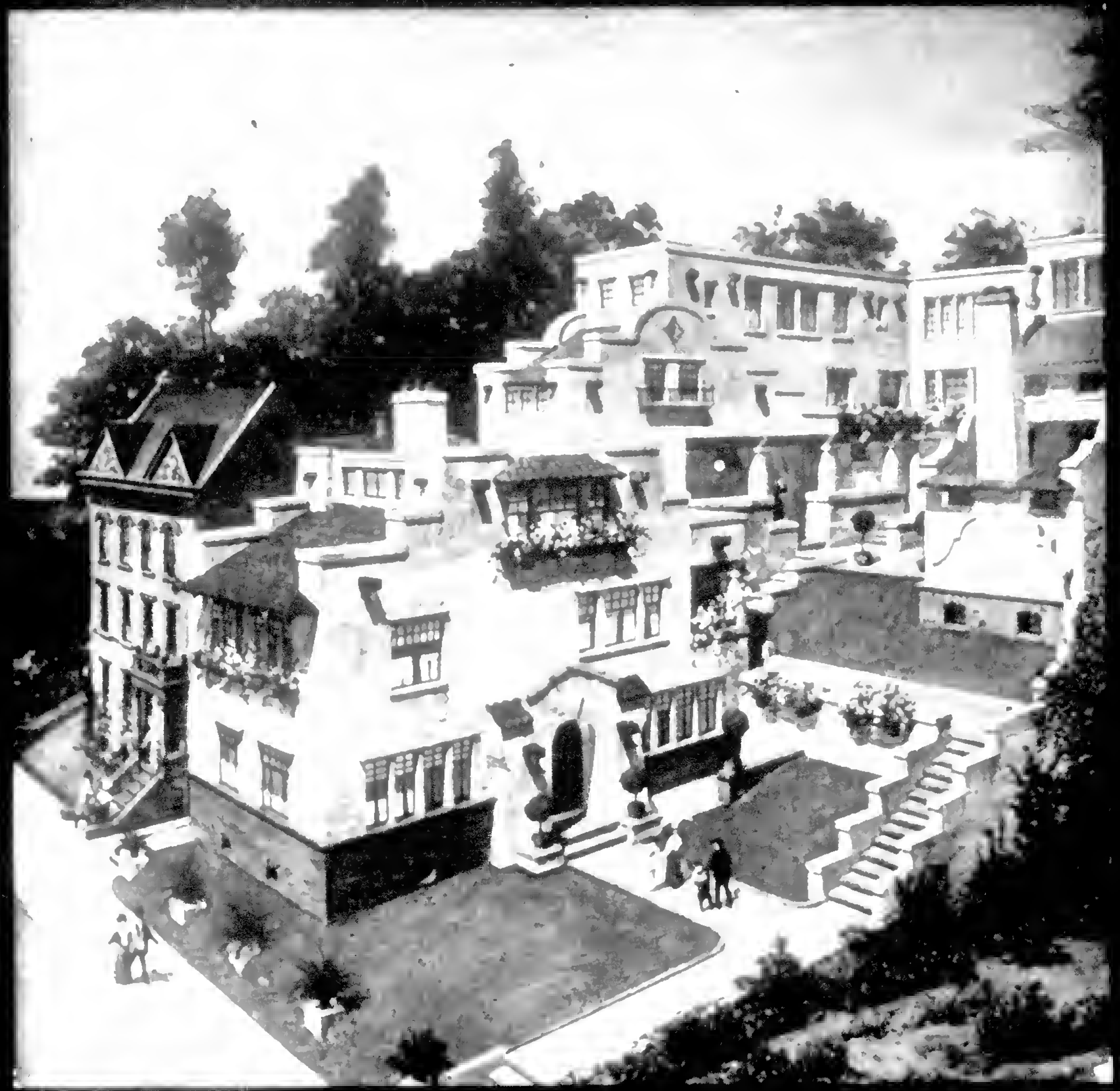

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CHRISTMAS NUMBER

Vol. XV. DECEMBER, 1908. No. 2.

The Livable House

By HENRY C. SMITH, Architect

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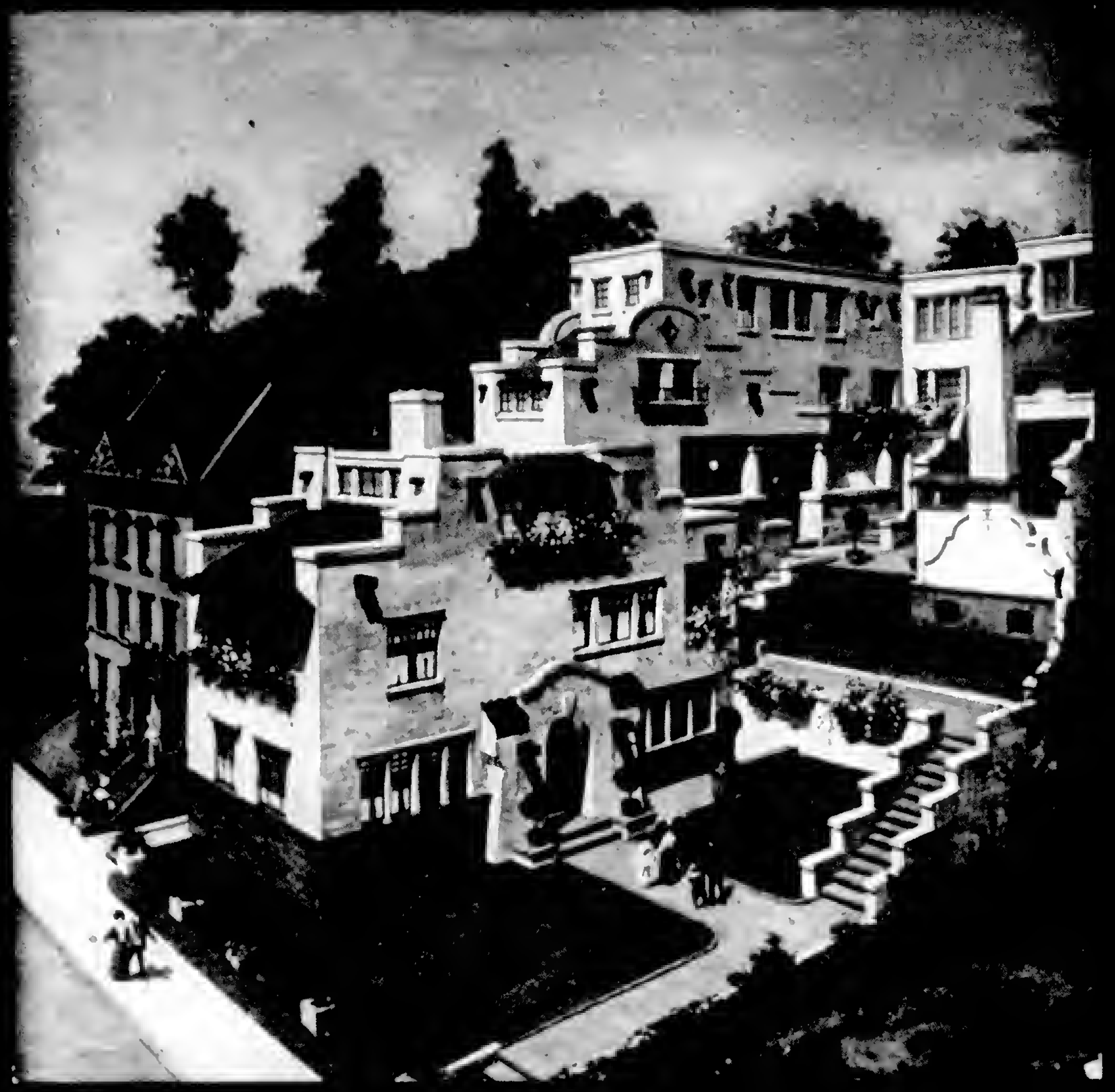
THE one cry of the average home builder in America has been the "practical," but why not make the practical beautiful. Most homes, to be successful and livable are too much in evidence; planked as near the curb line as the law allows. All air of privacy, a feature surely to be desired, is ignored and one sees the same high steps and round bay windows, whose bulky outlines overhang the sidewalk, with never a flower or a blade of grass to greet either the inhabitants or the passerby. Surely, here in San Francisco, where all the year round, with just a little care and thought, one could be surrounded by lawn and flowers. Why is it that most owners and builders clamor for the curb line?

It is quite essential that children should live in a harmonious atmosphere, learn to love color and feel it, see plants and flowers and be taught to care for them, but this can never be universally accomplished while the majority of landlords persist in utilizing every square inch of ground for their building, utterly ignoring the natural beauties they could have almost for the asking, and thereby make their places far more beautiful and consequently many, many times more livable.

Anyone can build a house, but "anyone" cannot make it livable. The successful house has an atmosphere which is indescribable, that something which makes one want to linger with a sense of peace and rest not found in most of our modern, ornate, cluttered rooms.

Tones that are not harmonious get on one's nerves quite as much as a discordant note in music, and are apt to last much longer.



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Glimpse of Garden

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HENRY C. SMITH, Architect

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Simple Lines with Satisfactory Results

The aesthetic side of house building has been sadly neglected, and love of the ornate is one of the glaring faults of many places, as any house which shows simply the dollar sign is a decided failure.

How well we all know the room with the gas grate, doors and windows hung in brocaded festoons and tassel fringe, with a lamp in the bay window which is never lighted, and spindle-leg gold chairs which were never built to sit on, and yet, horror of horrors, it is called a living room!

Rooms to be successful must have a lived-in look, which can never be acquired by sacrificing the things of comfort for the purpose of effect. The most delightful characteristic a house can possess is a general air of invitingness, but very few places show in the furnishings and decorations any controlling idea. As a rule the most convenient and simple arrangement results in the most beautiful and satisfactory effects.

The livable house must, first of all, be practical, but by making all the practical points beautiful a harmonious result can be obtained. With good proportions, solid, visible construction, an open fireplace on simple lines, a room does not necessarily need elaborate hangings or furniture to make it attractive. All homes are, and should be, entirely different, yet all can have brightness and real beauty and be livable if harmony is sought with singleness of purpose. A comfortable chair placed in a good light, with a table at one's elbow on which lies a magazine or two, with a few of one's favorite books, soft side-lights and flowers and plants in evidence, and always, if possible, an open fire, as I know of no keener joy after a strenuous day, when the weather without is cold and disagreeable, than to sit and watch the flames of a log fire curl and leap upward in a room where the atmosphere is one of peace and harmony—these are the features that contribute to the ideal living room. So the house which, by its restful lines, harmonious tones, cheerfulness and pleasant outlook, a place in which one would fain linger, is a success whether it costs a million or a few thousand.

Where One Would Fain Linger

By trained intelligence, refined and simple taste, knowing true beauty and being content with simplicity and genuineness, a livable house can be obtained without great expenditure.

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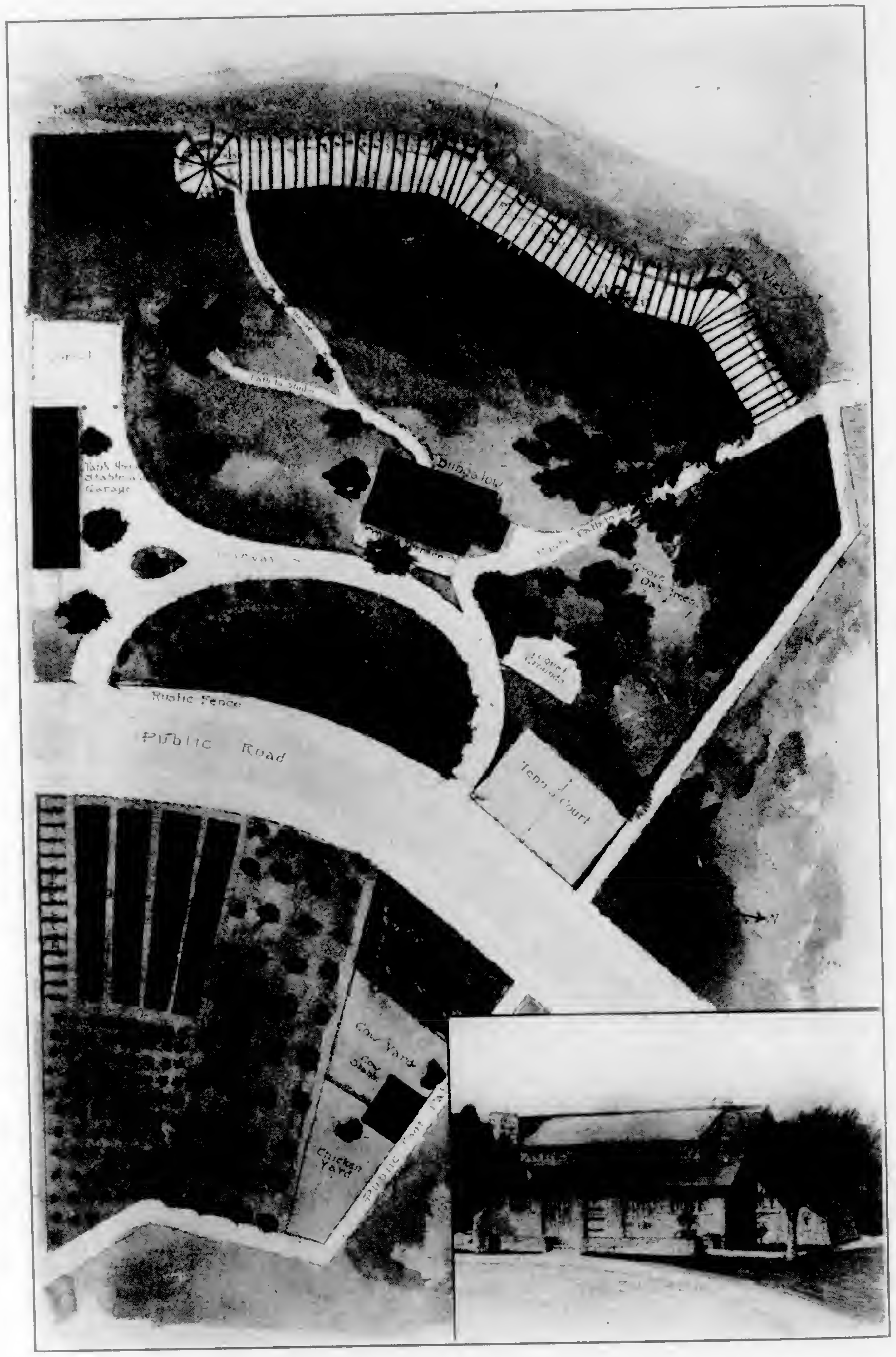
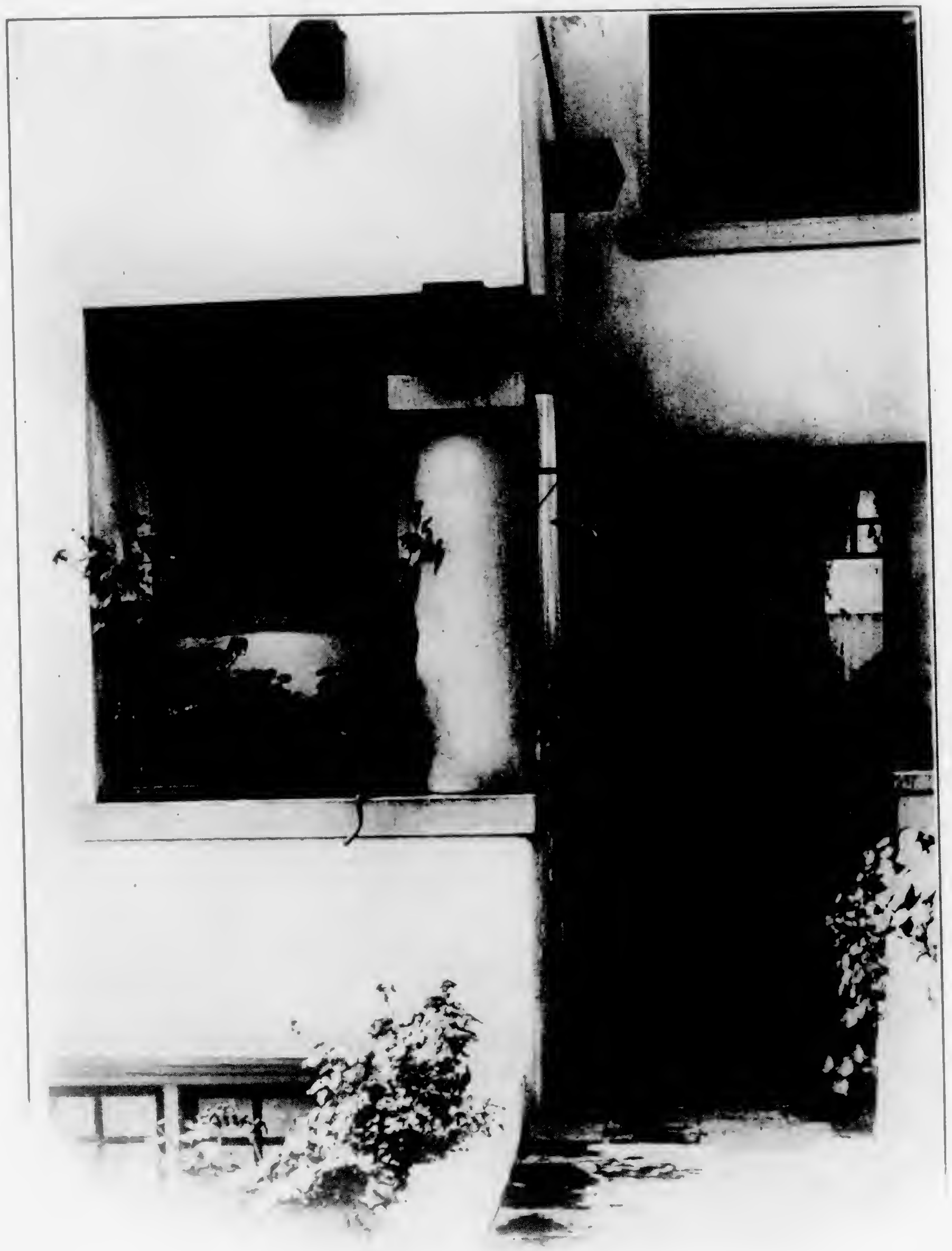
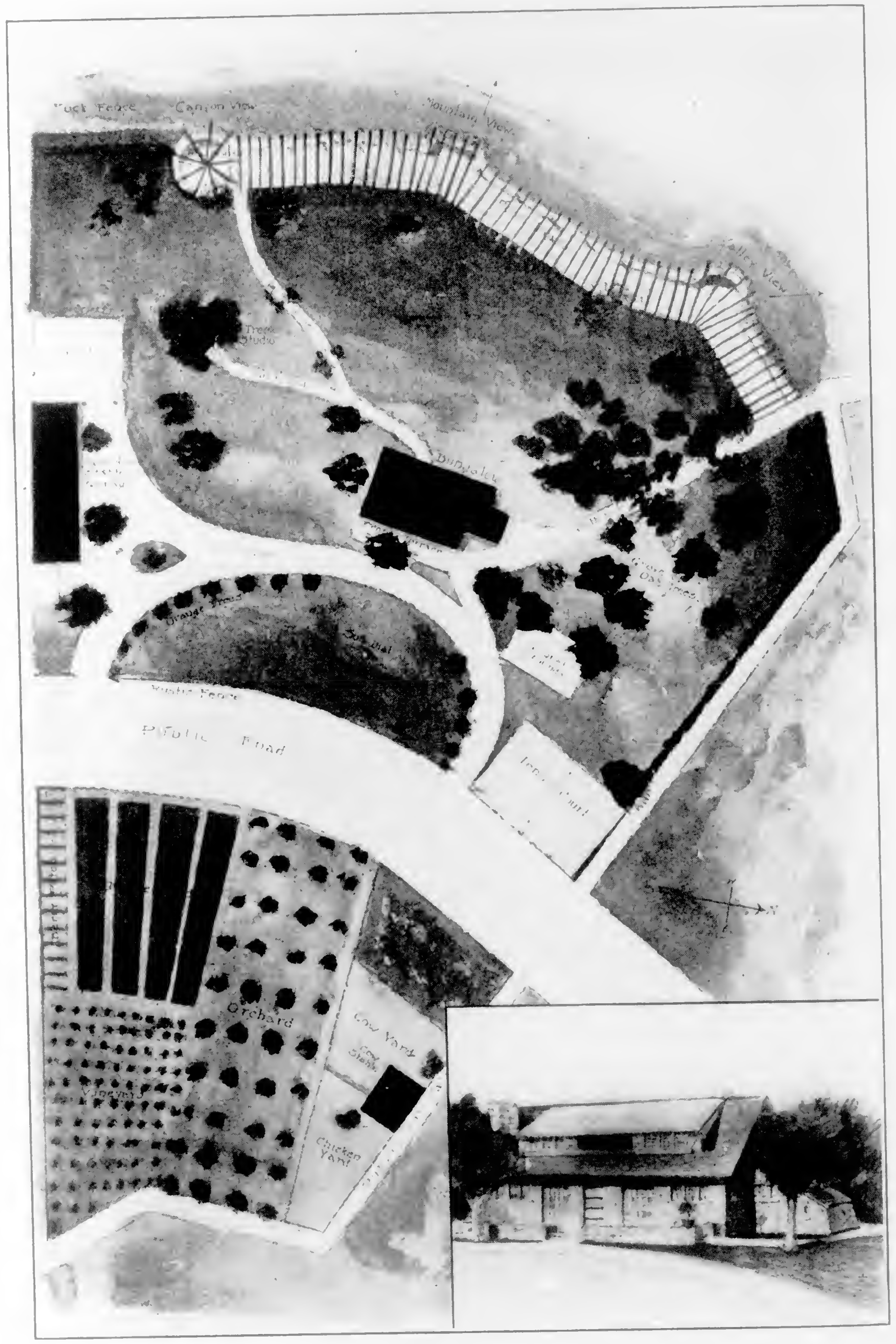

Bungalow
Path to Stable
Stable and Garage
Grove Oak Trees
Croquet Grounds
Rustic Fence
Public Road
Tennis Court
Cow Yard
Cow Stable
Chicken Yard
Public Road
N

Country Home of Henry C. Smith, at Los Gatos, Showing Landscape Features



Front Entrance to the B. T. Bean Apartments, San Francisco
Louis S. Stone and Henry C. Smith, Architects


Rock Fence
Canyon View
Mountain View
Valley View
Tree Studio
Bungalow
Great Oak Trees
Orange Trees
Sun Dial
Rustic Fence
Public Road
Tennis Court
Orchard
Cow Yard
Cow Stable
Chicken Yard

Country Home of Henry C. Smith, at Los Gatos, Showing Landscape Features

* * *

Court Entrance to the B. F. Bean Apartments, San Francisco
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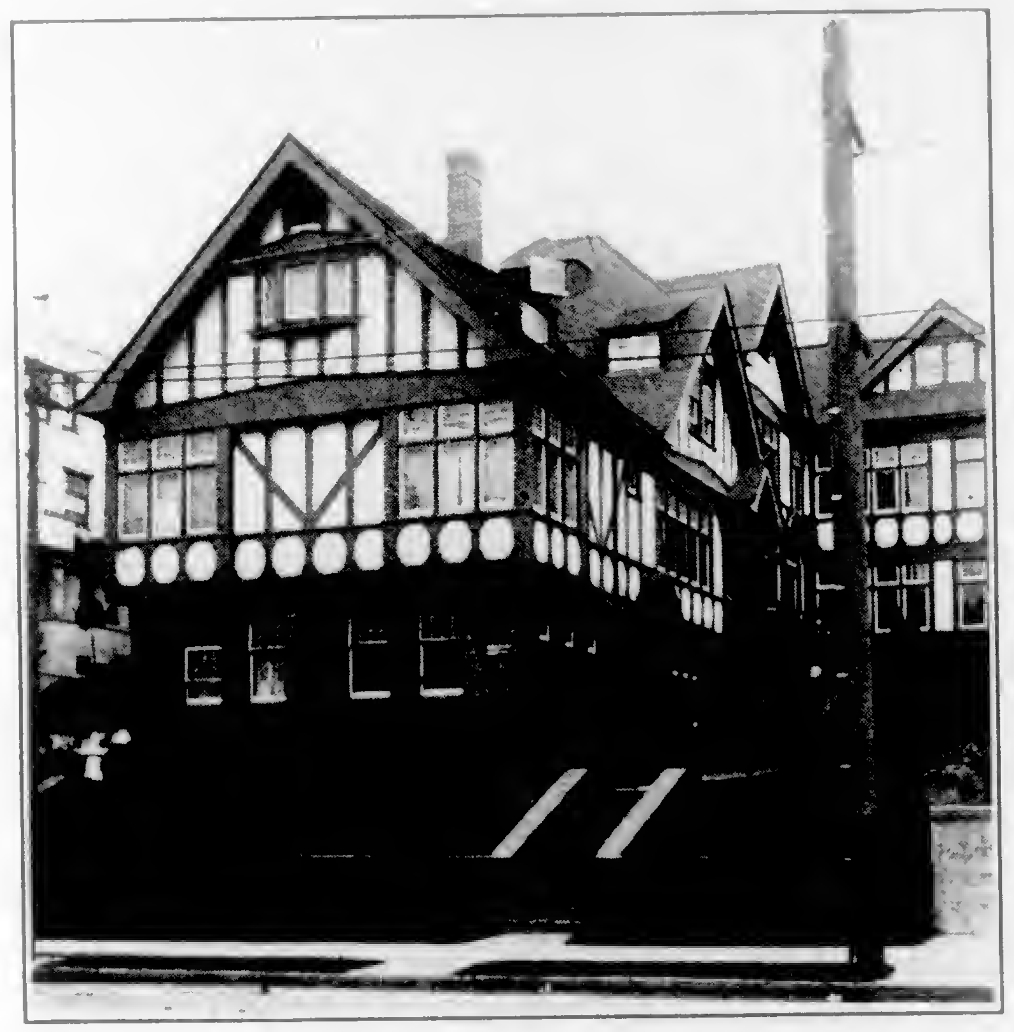

"The Terraces"
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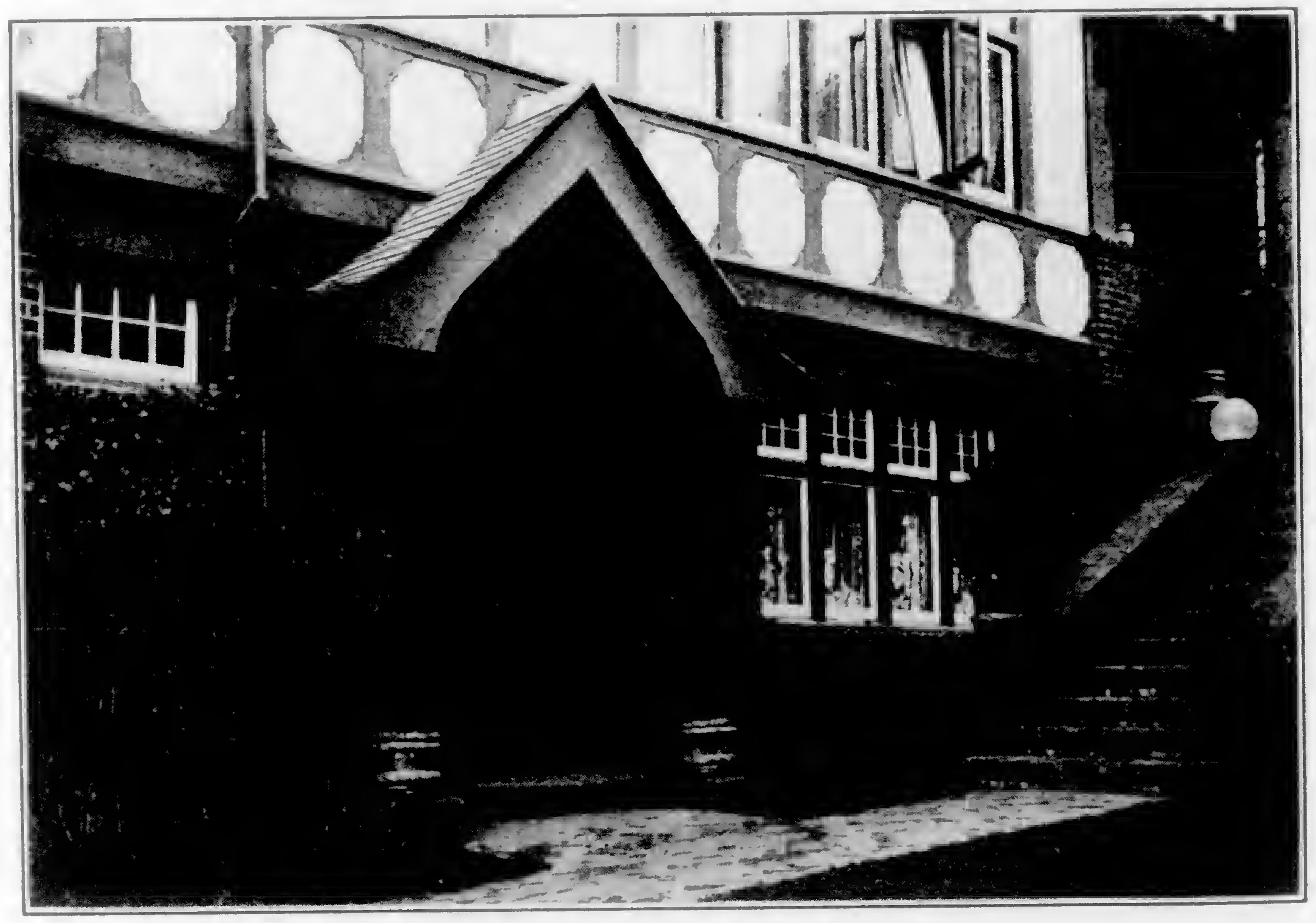
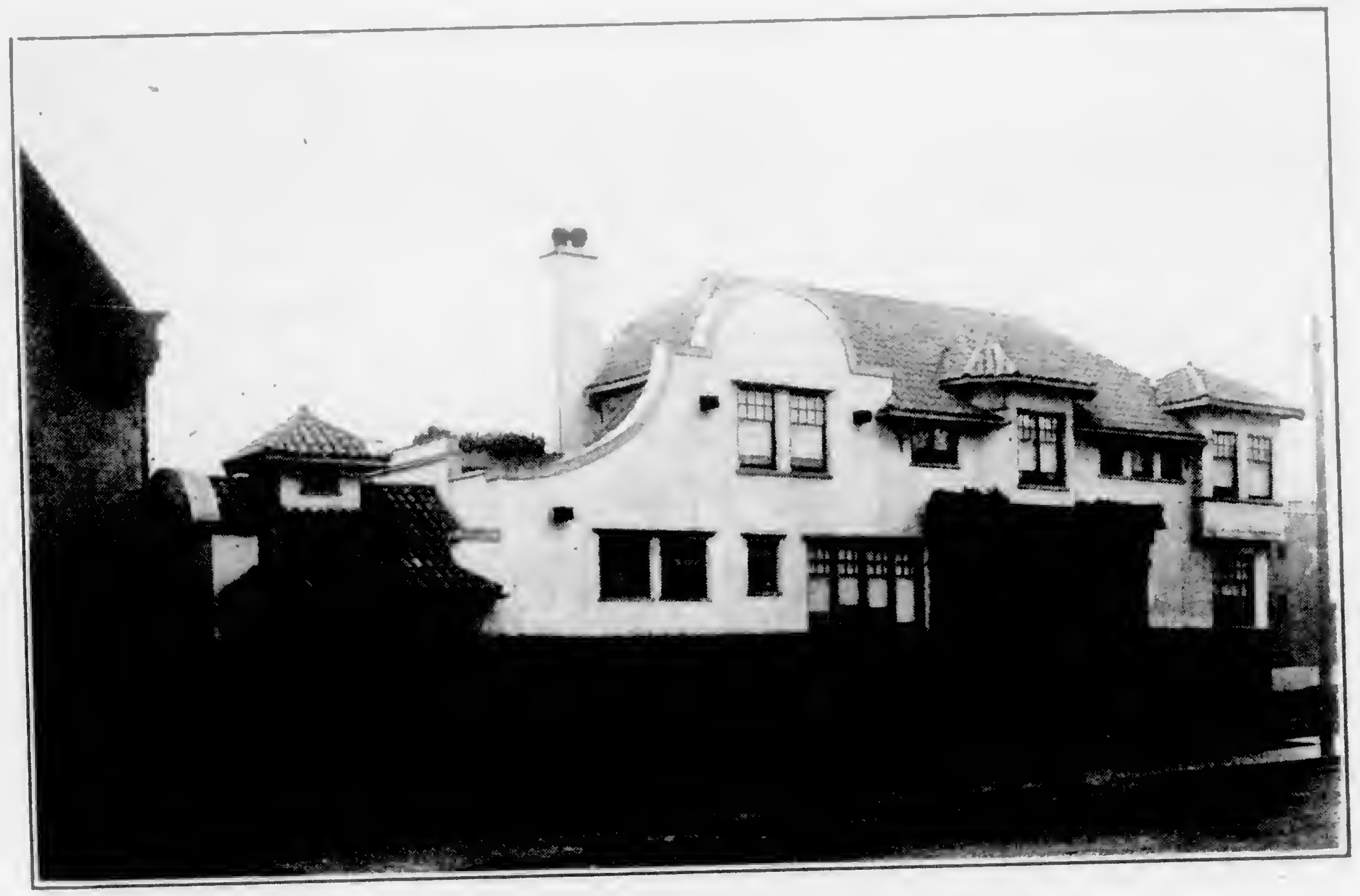
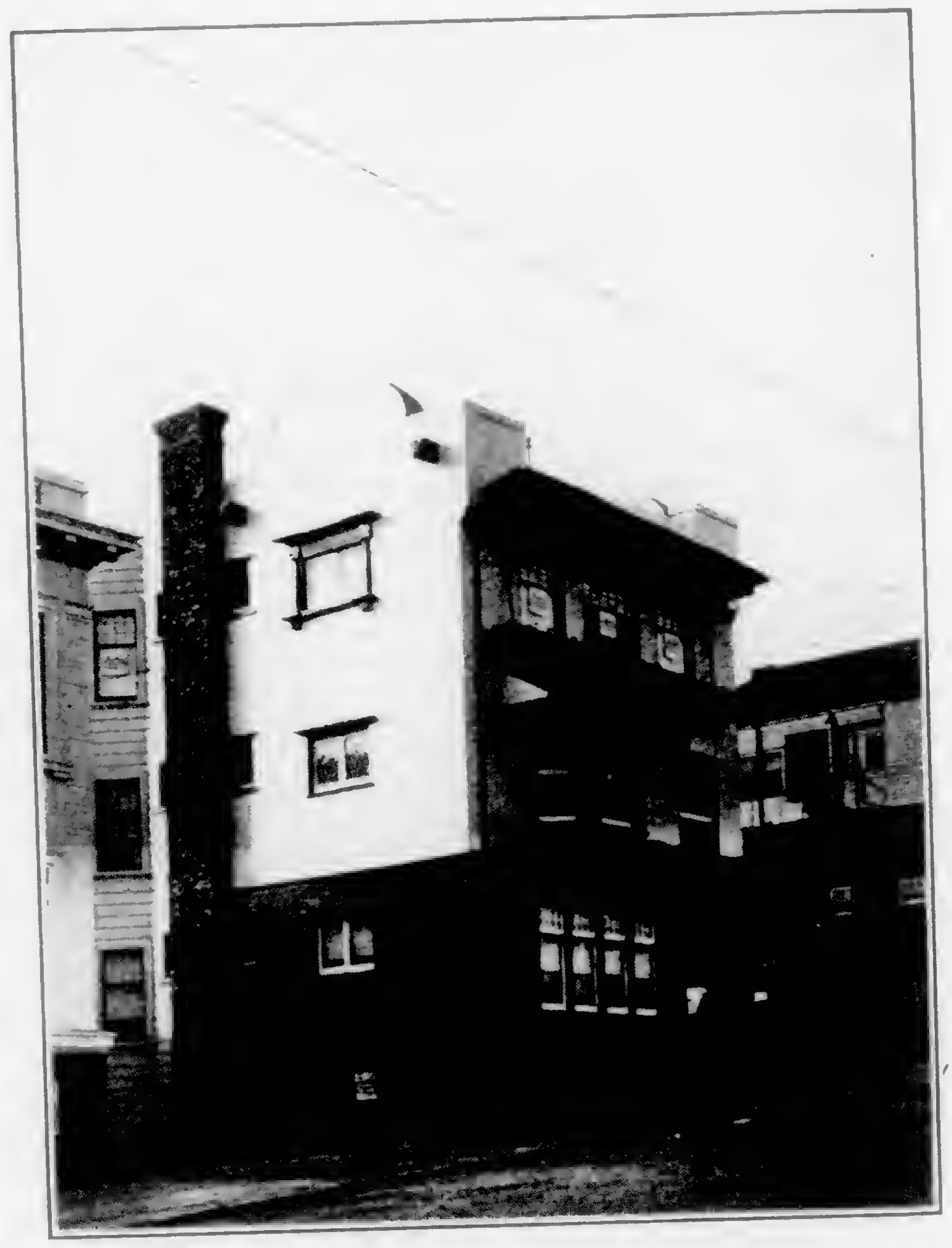


Entrance to Dr. D. Stafford's Apartments, "The Terraces," San Francisco
Louis S. Stone and Henry C. Smith, Architects



J. Sheldon Potter Residence and Garage, San Francisco
Louis S. Stone and Henry C. Smith, Architects



Flats of Mrs. D. Eisenbach, San Francisco
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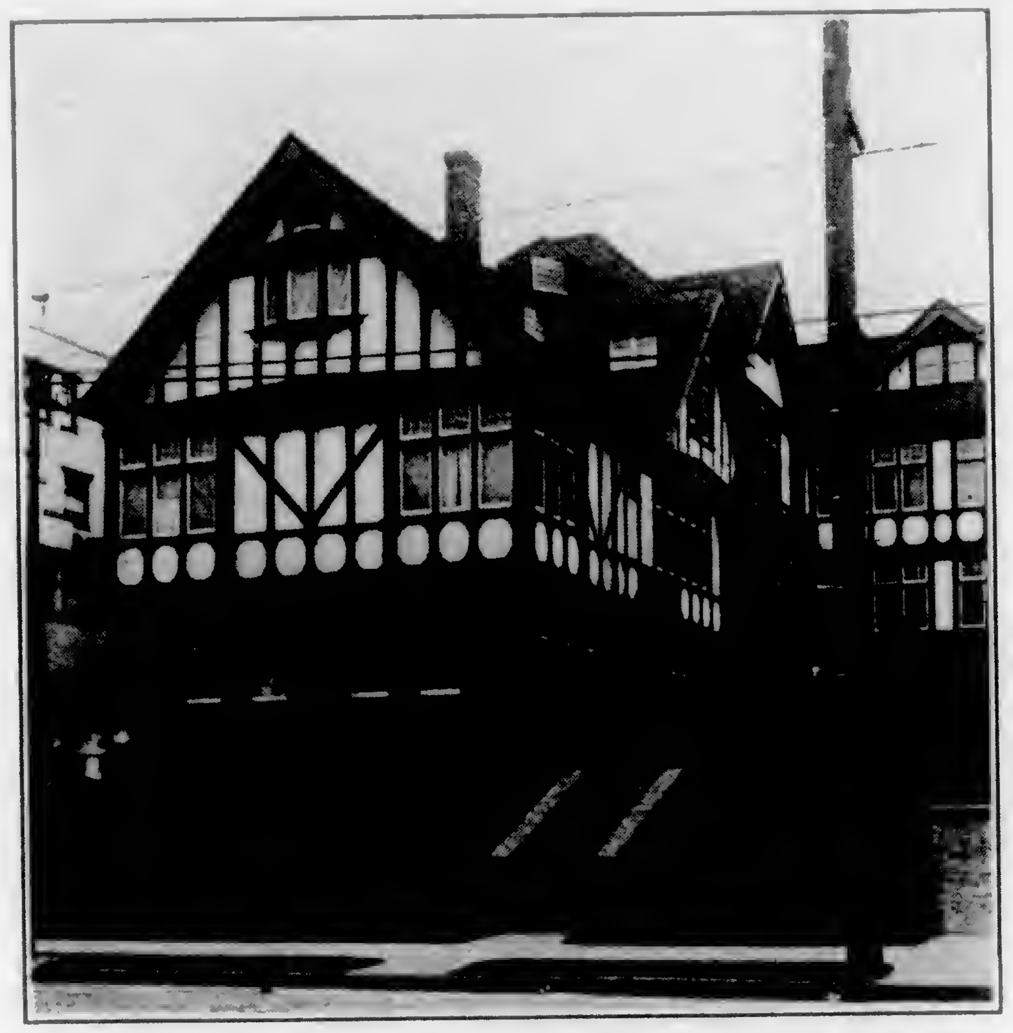

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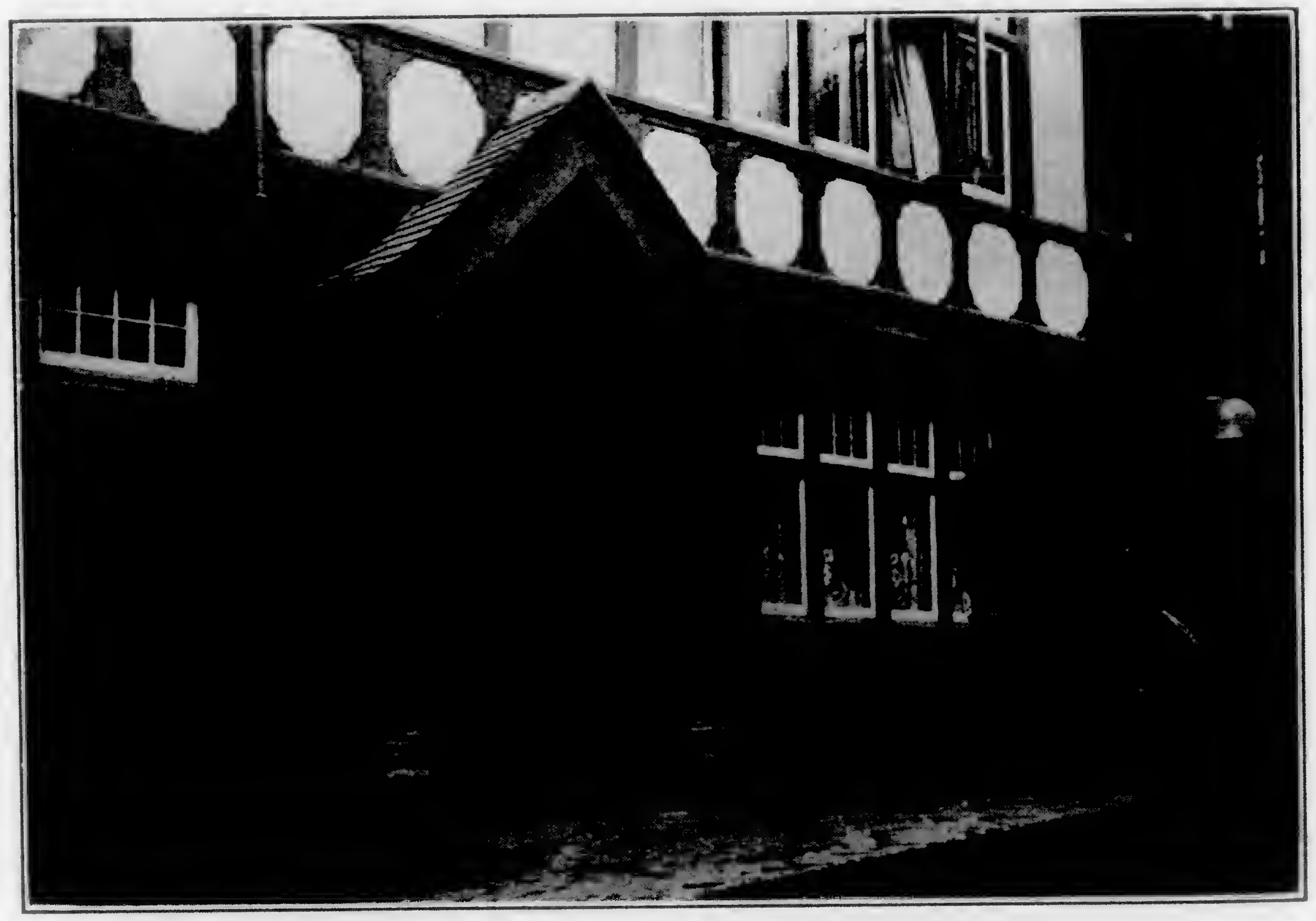

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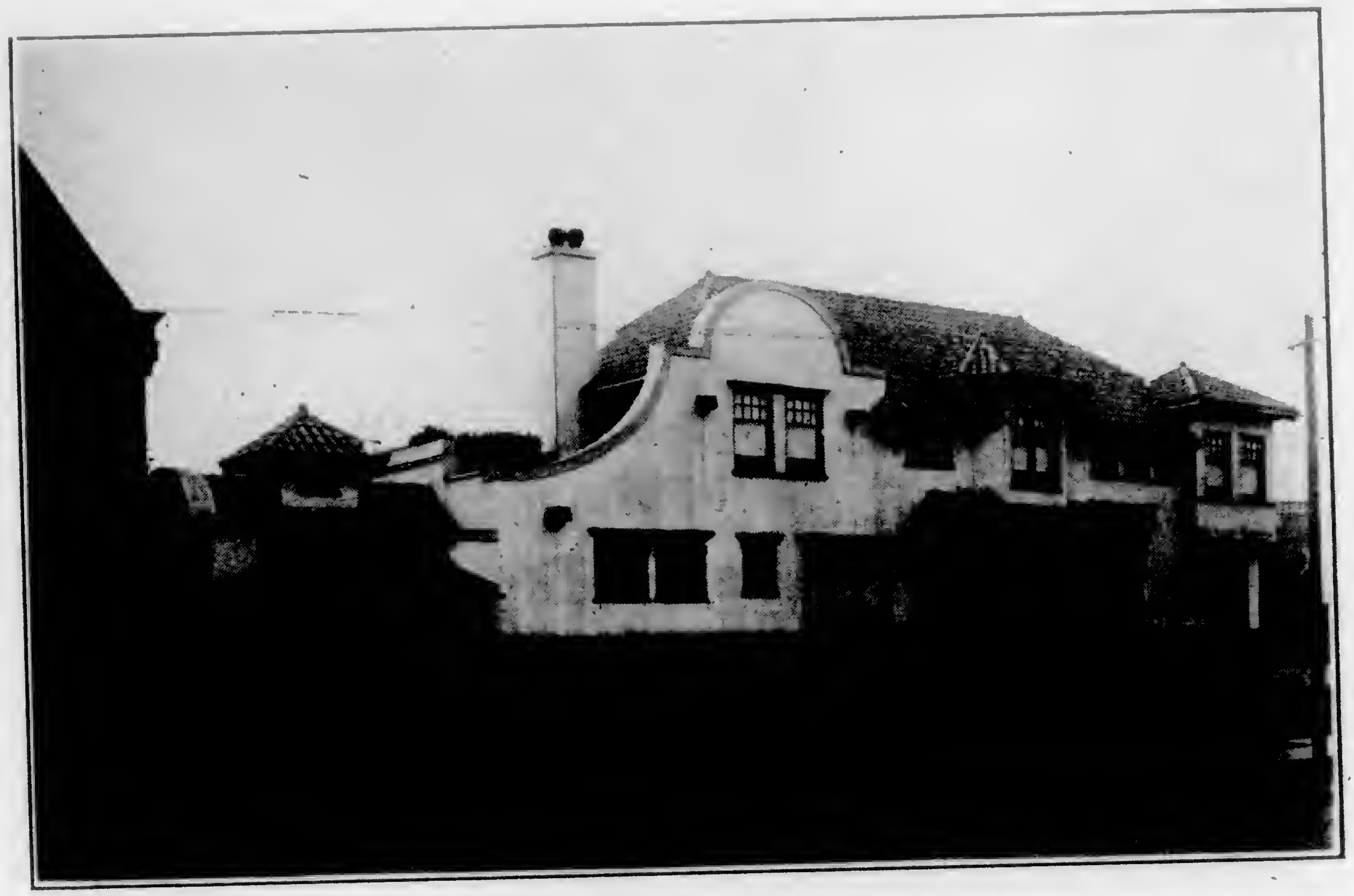

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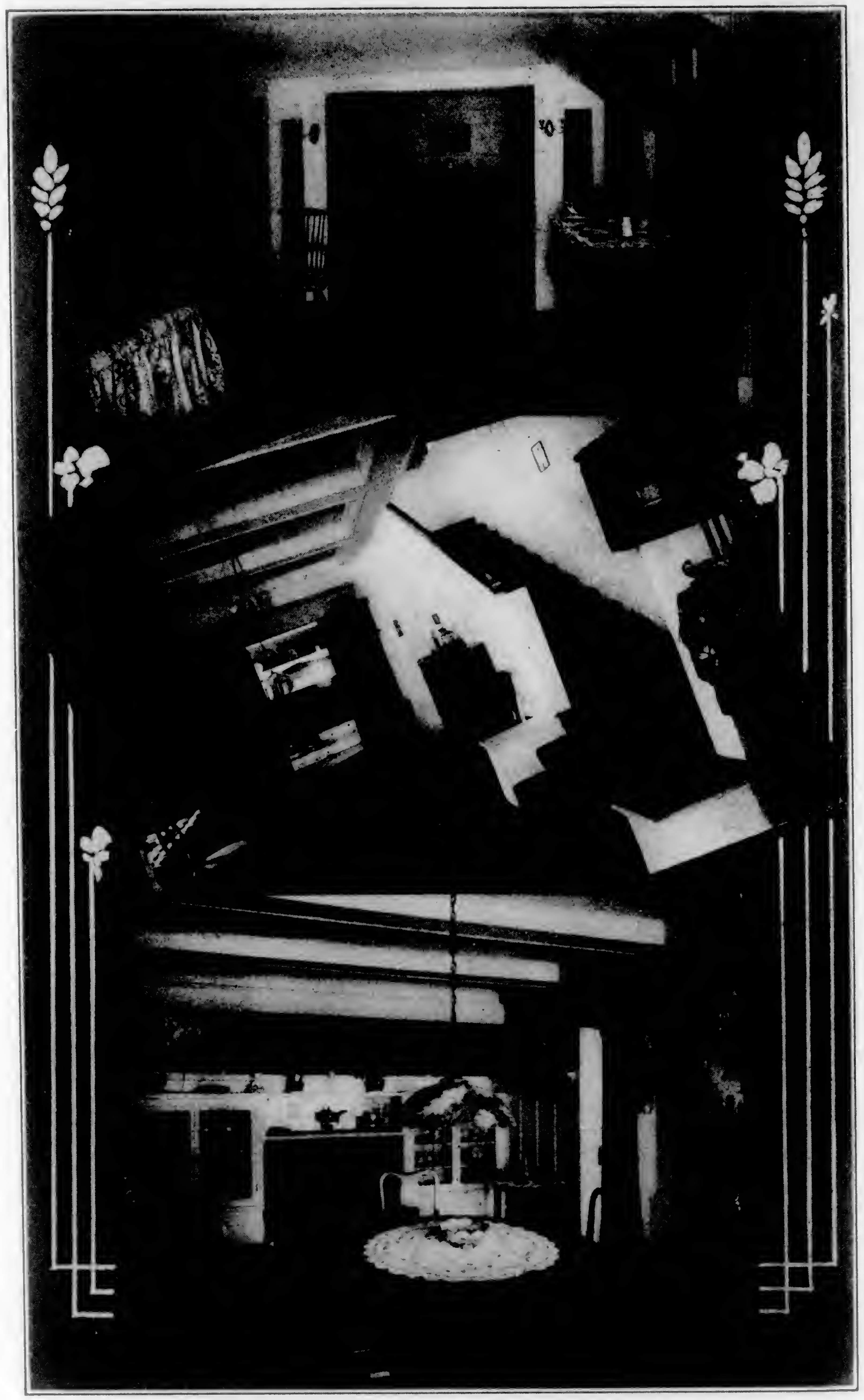
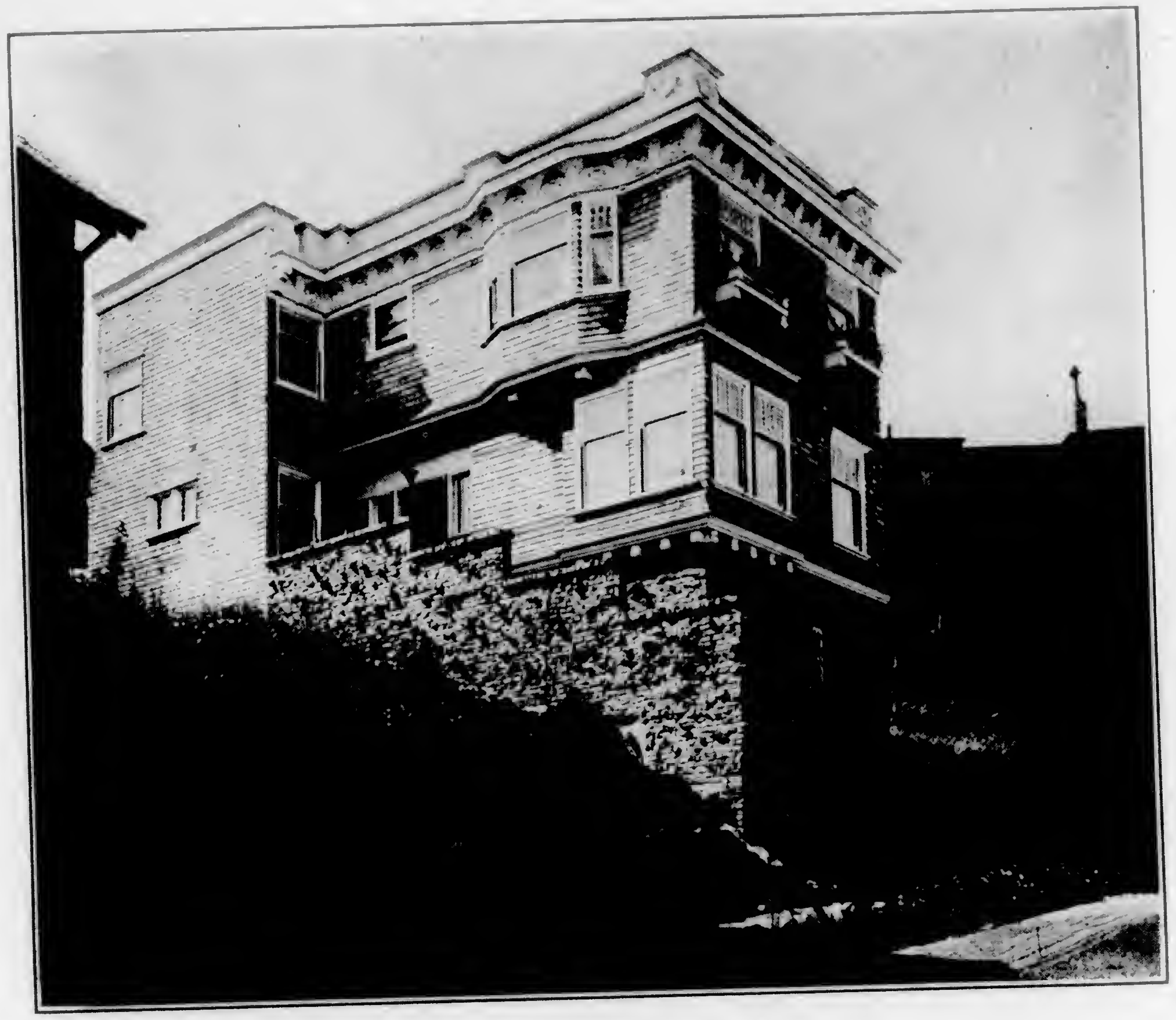


Residence of Mr. J. Sheldon Potter, San Francisco Boudoir, Reception Hall and Dining Room
Louis S. Stone and Henry C. Smith, Architects



Residence of Mr. Edgar Ball, San Francisco
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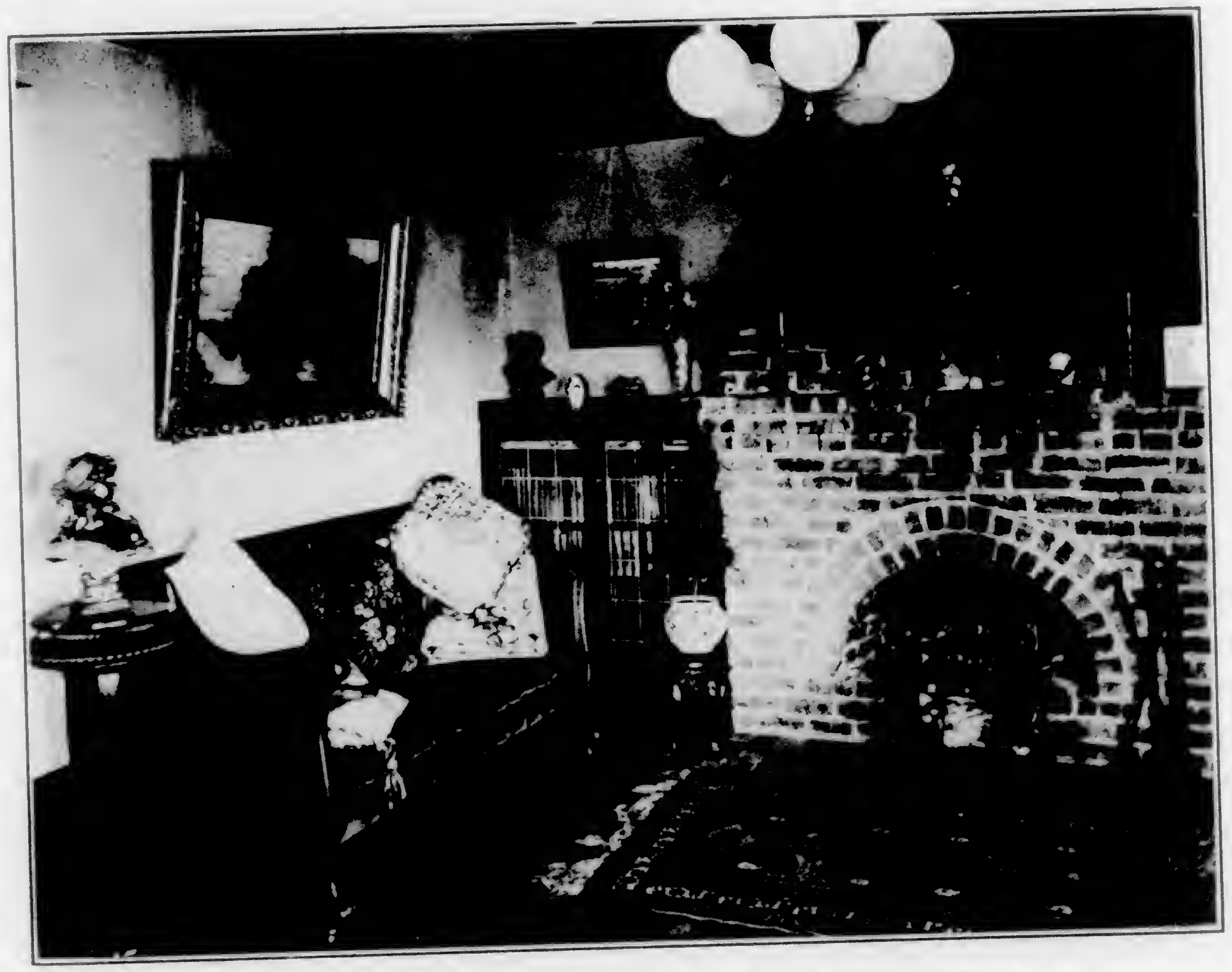
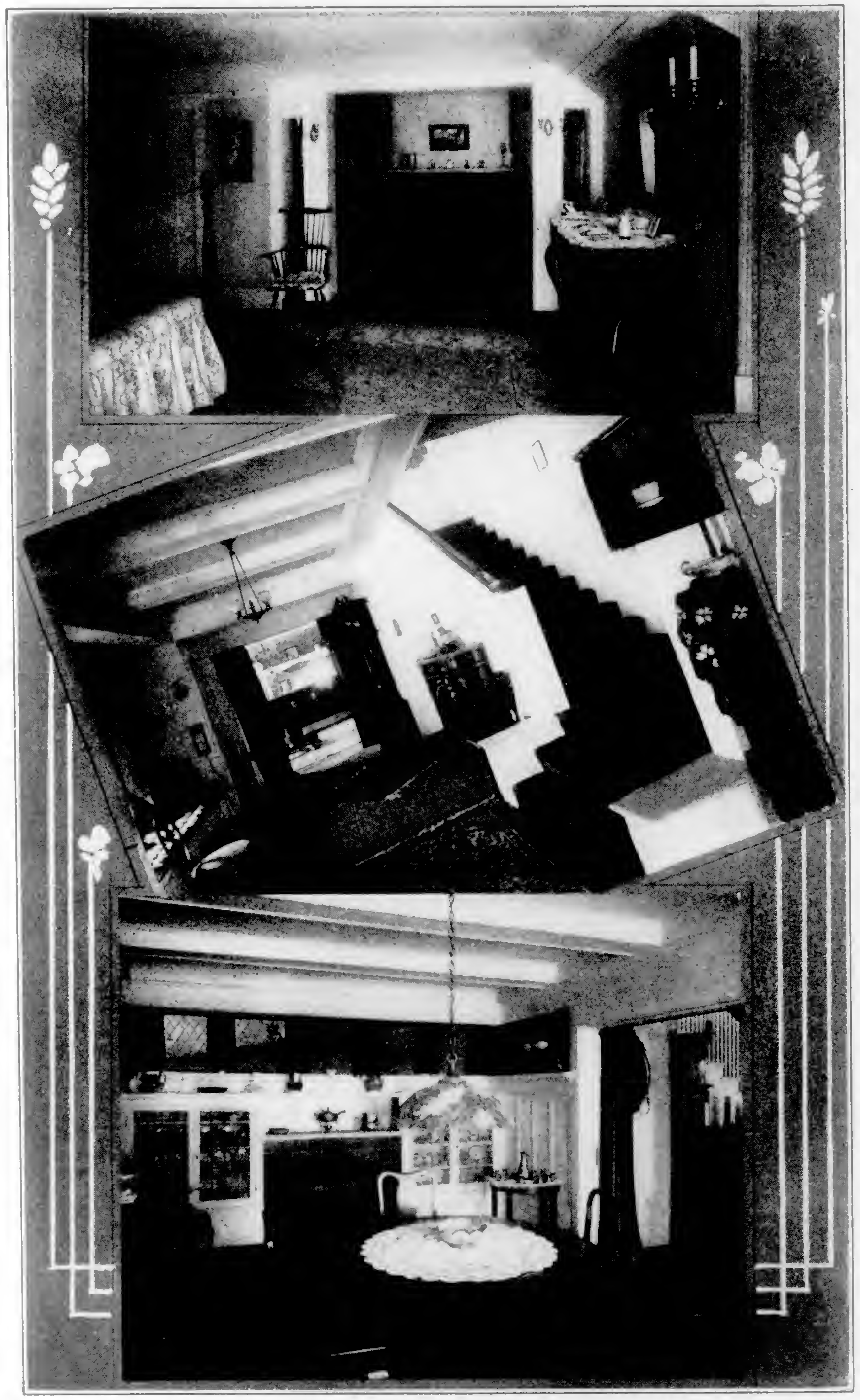


Chimney Corner in Living Room of Mr. Edgar Ball's Residence



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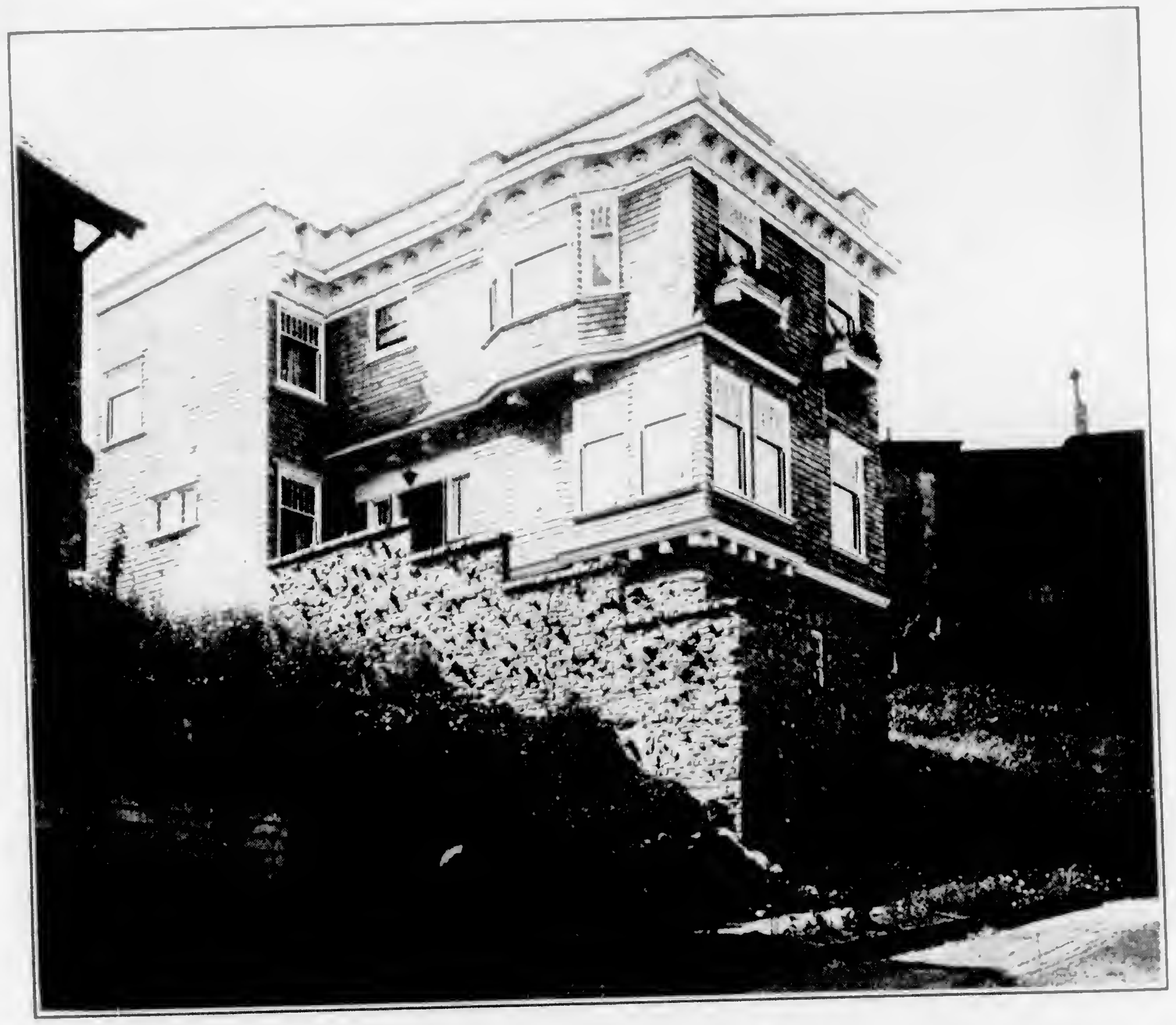

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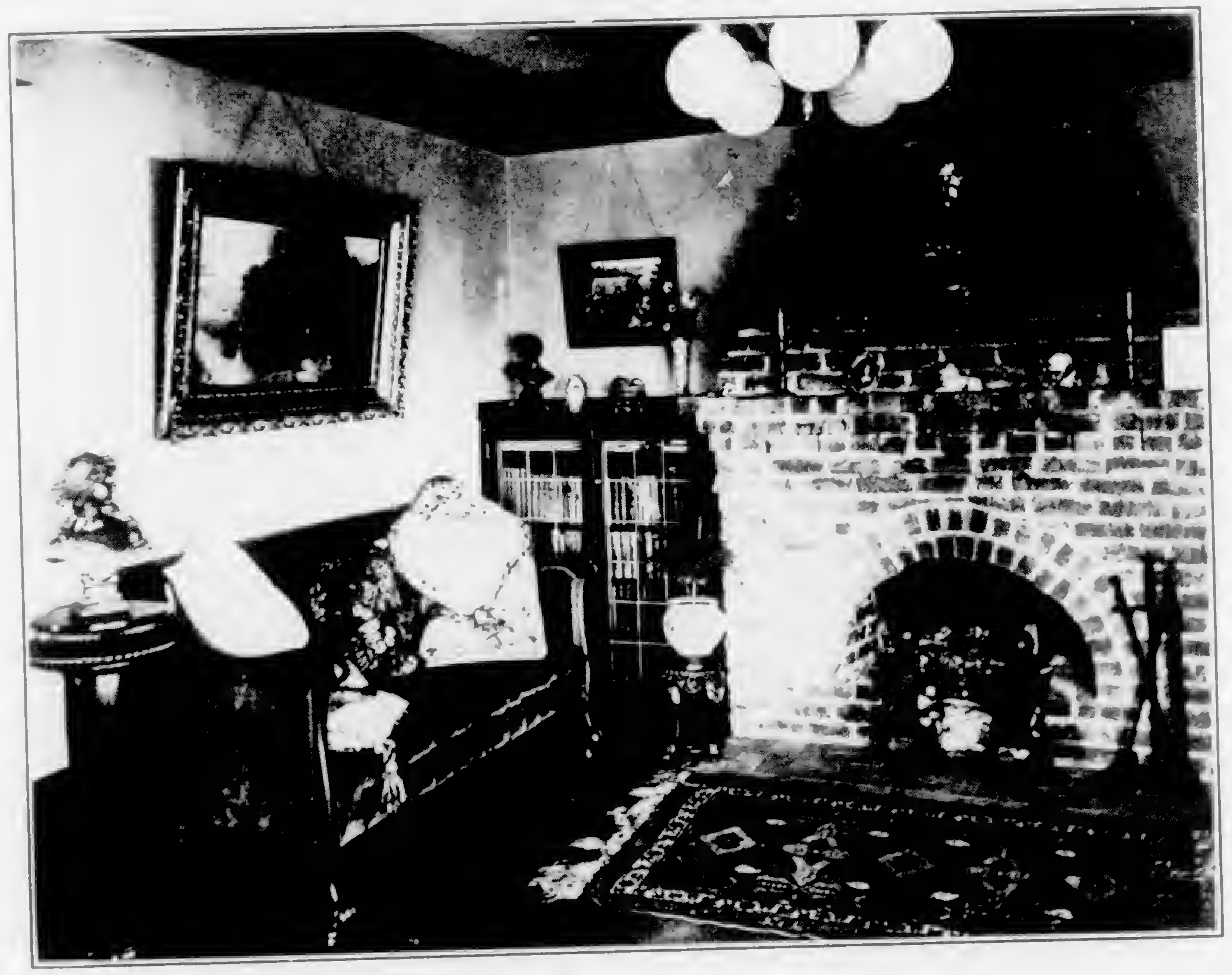

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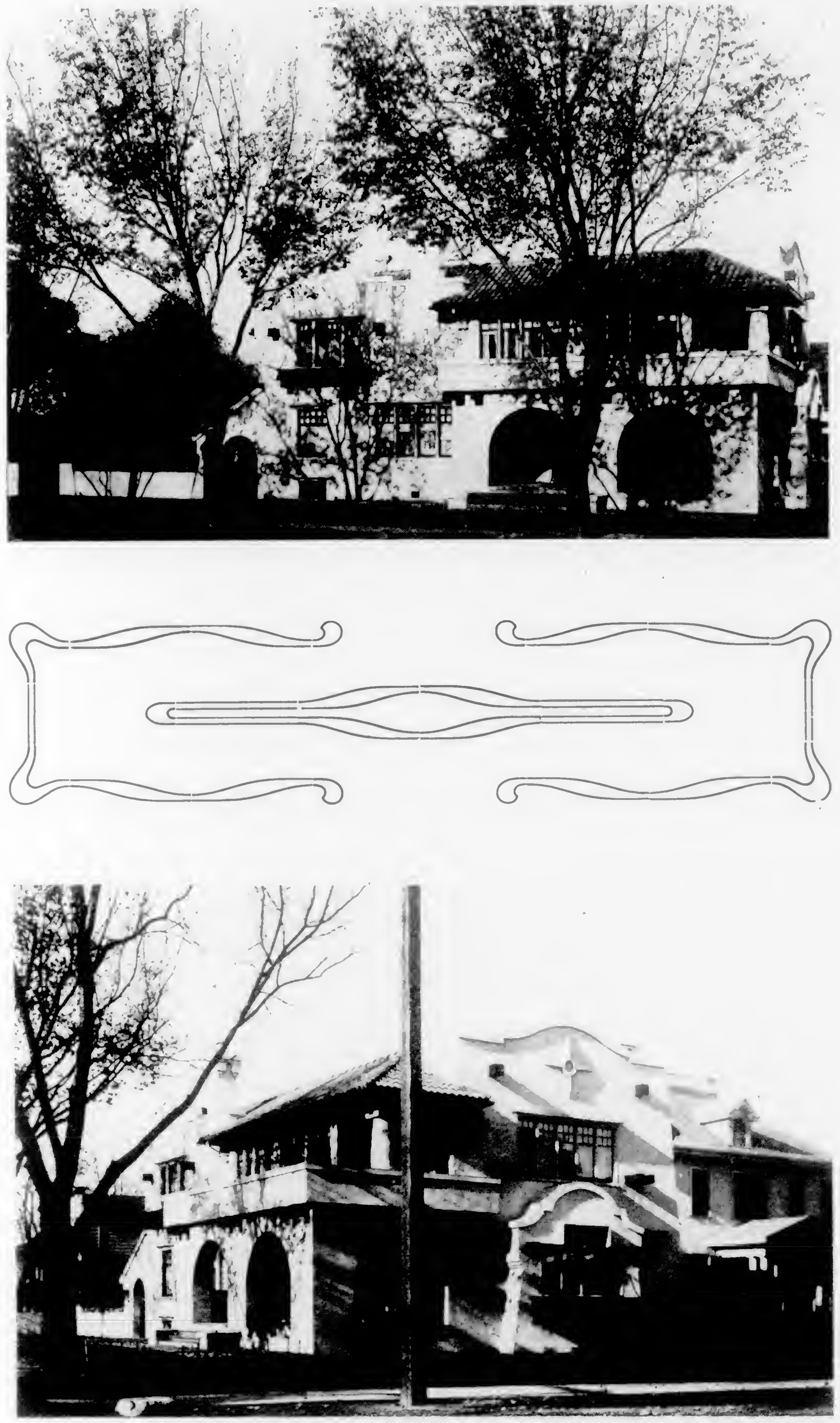
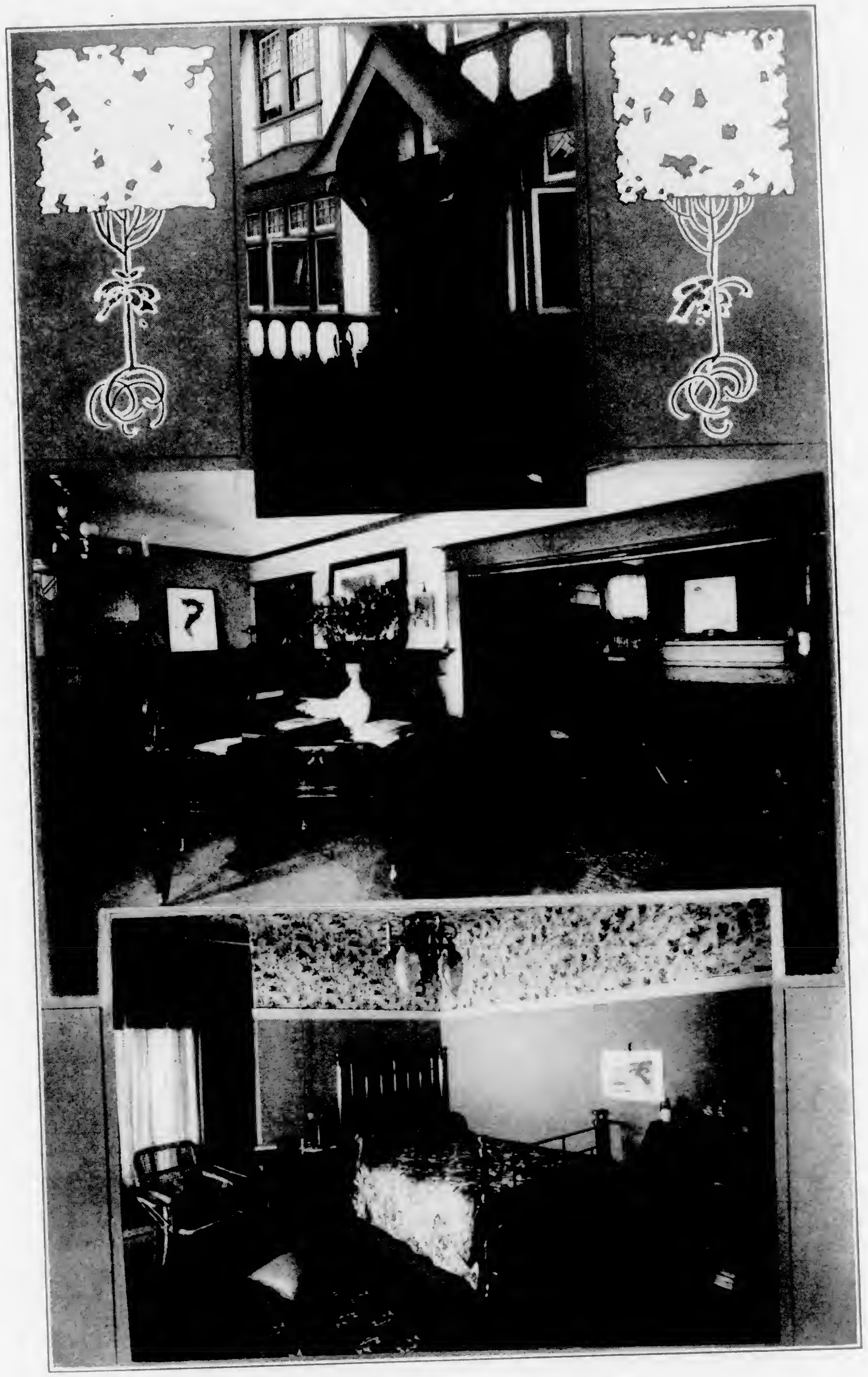
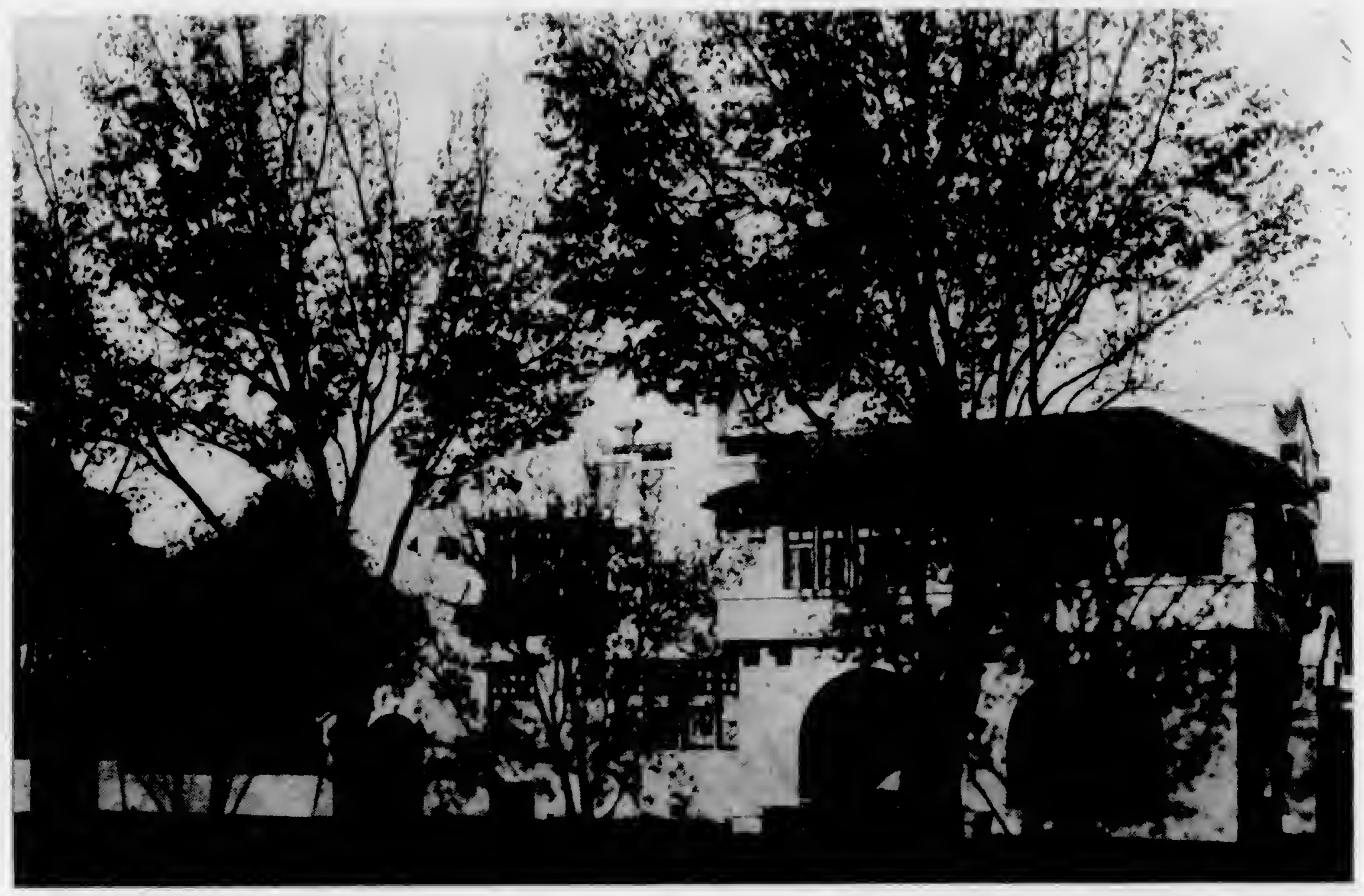
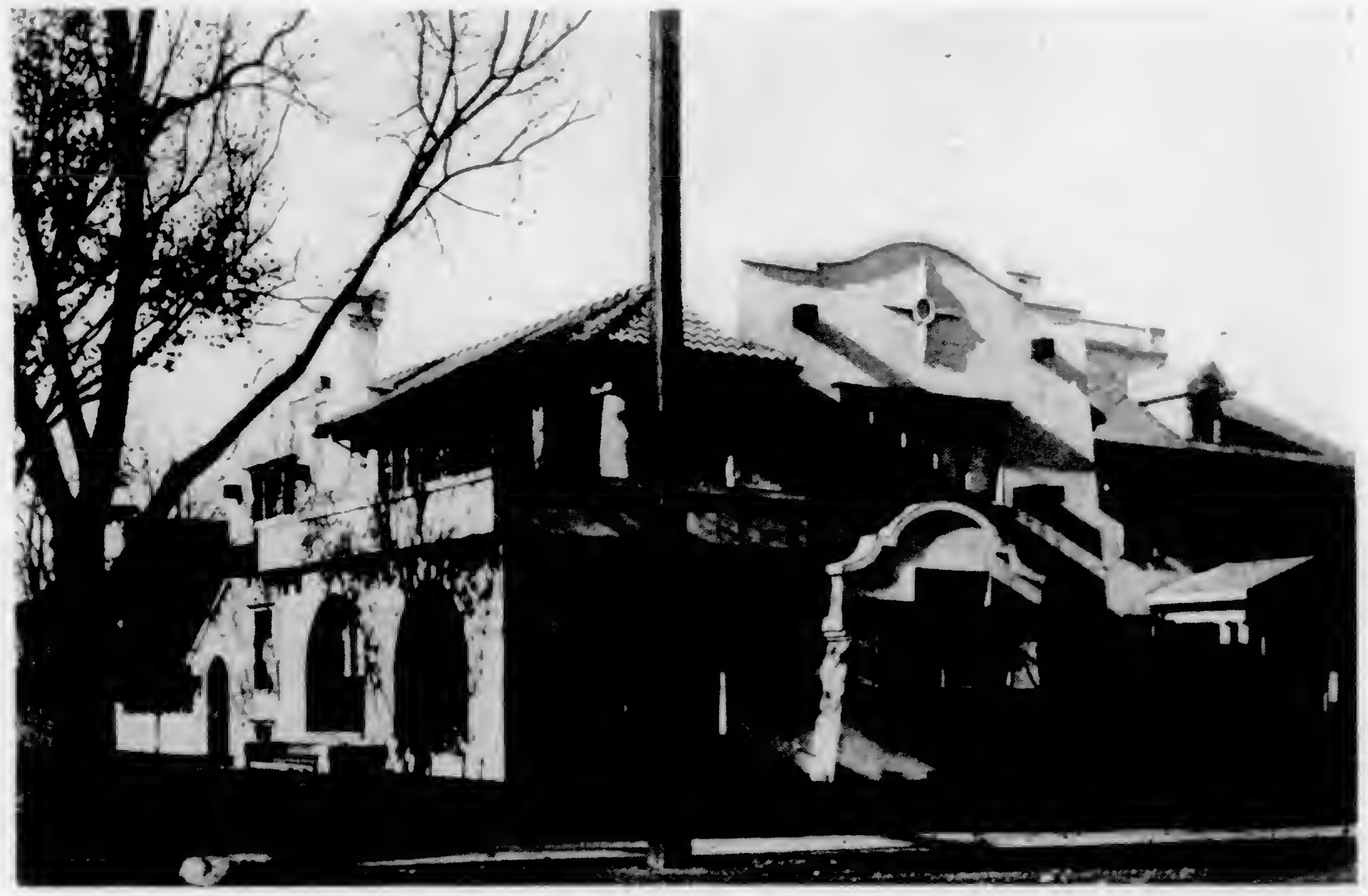


L. Hartman's Residence, San Jose, Cal.
Louis S. Stone and Henry C. Smith, Architects



Residence of Mrs. E. Newton, San Francisco
Entrance, Inglenook and Bed Chamber





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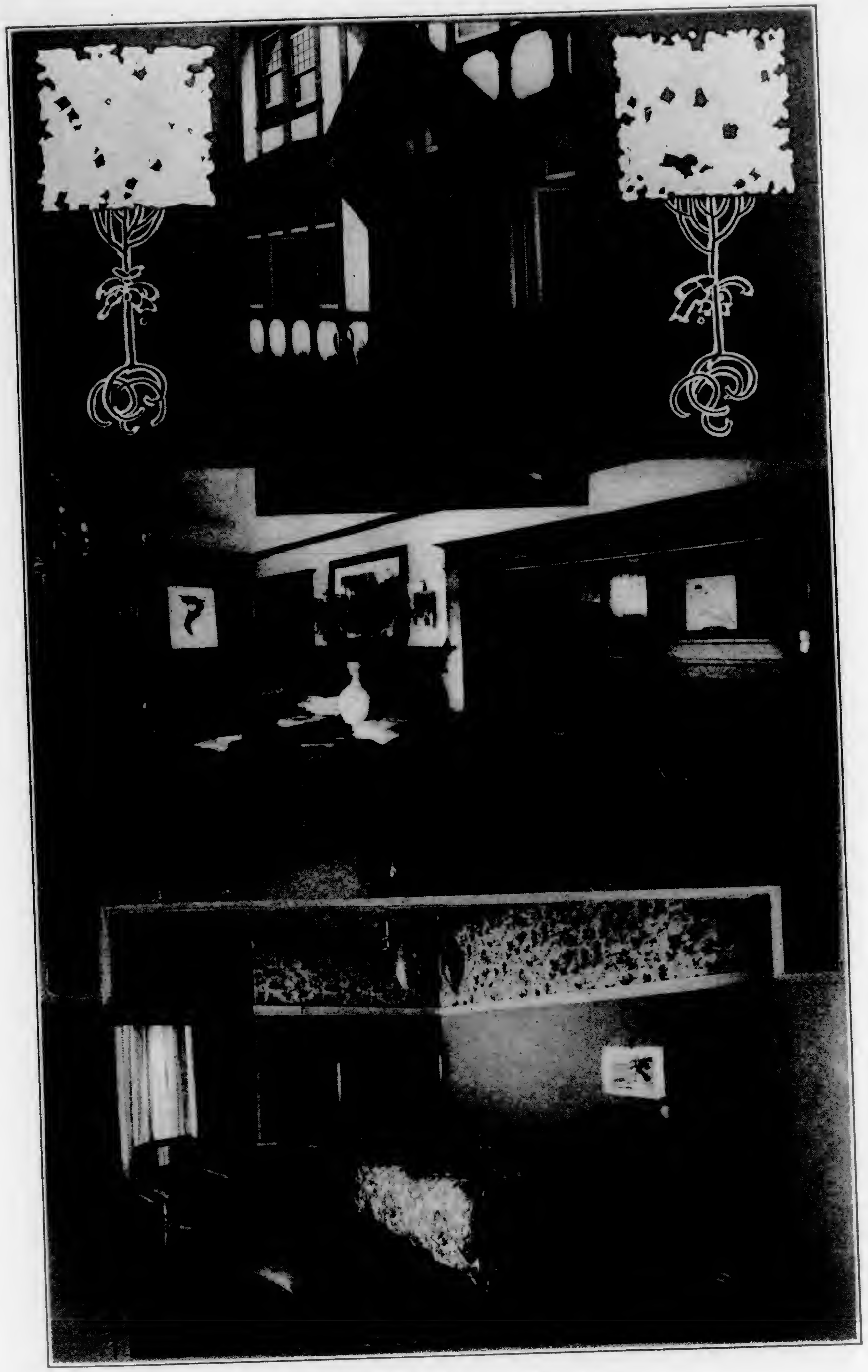

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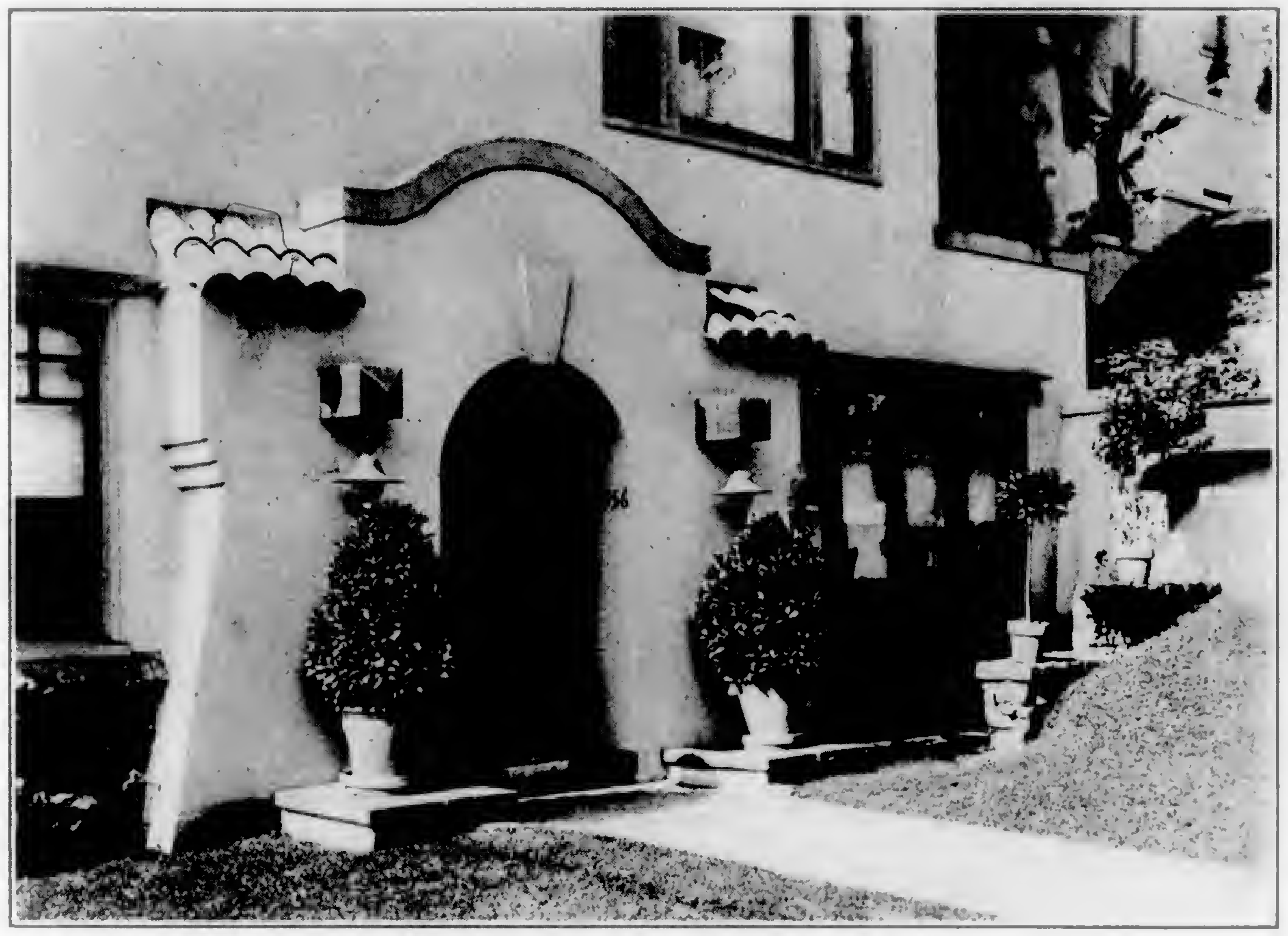
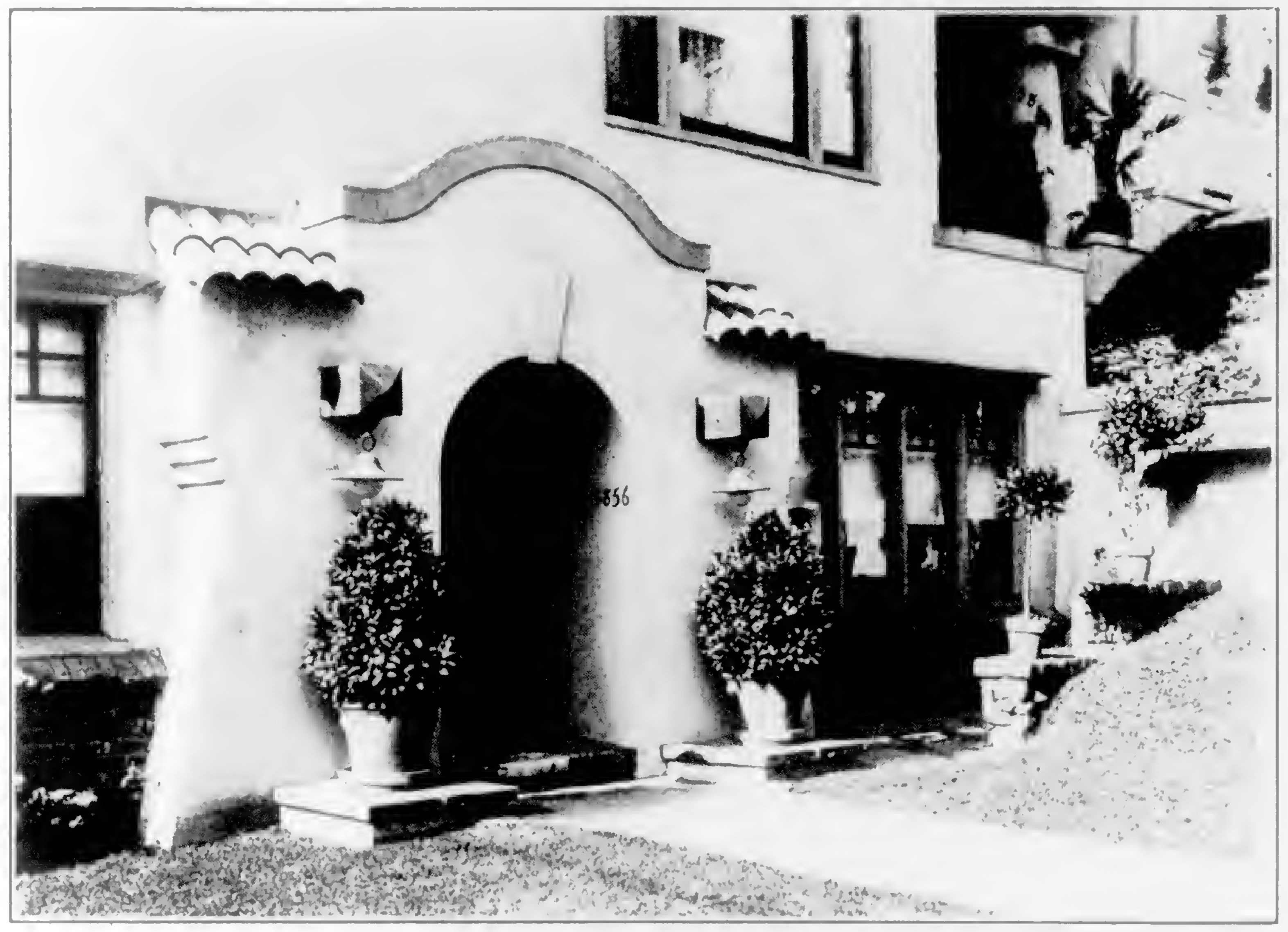


Mission Entrance, Clarence Coleman Apartments
Louis S. Stone and Henry C. Smith, Architects

A Bit of Simple, Massive Construction

Price and Andrews Flats, San Francisco
Louis S. Stone and Henry C. Smith, Architects

Residence of Dr. A. Schloss, San Francisco
Louis S. Stone and Henry C. Smith, Architects



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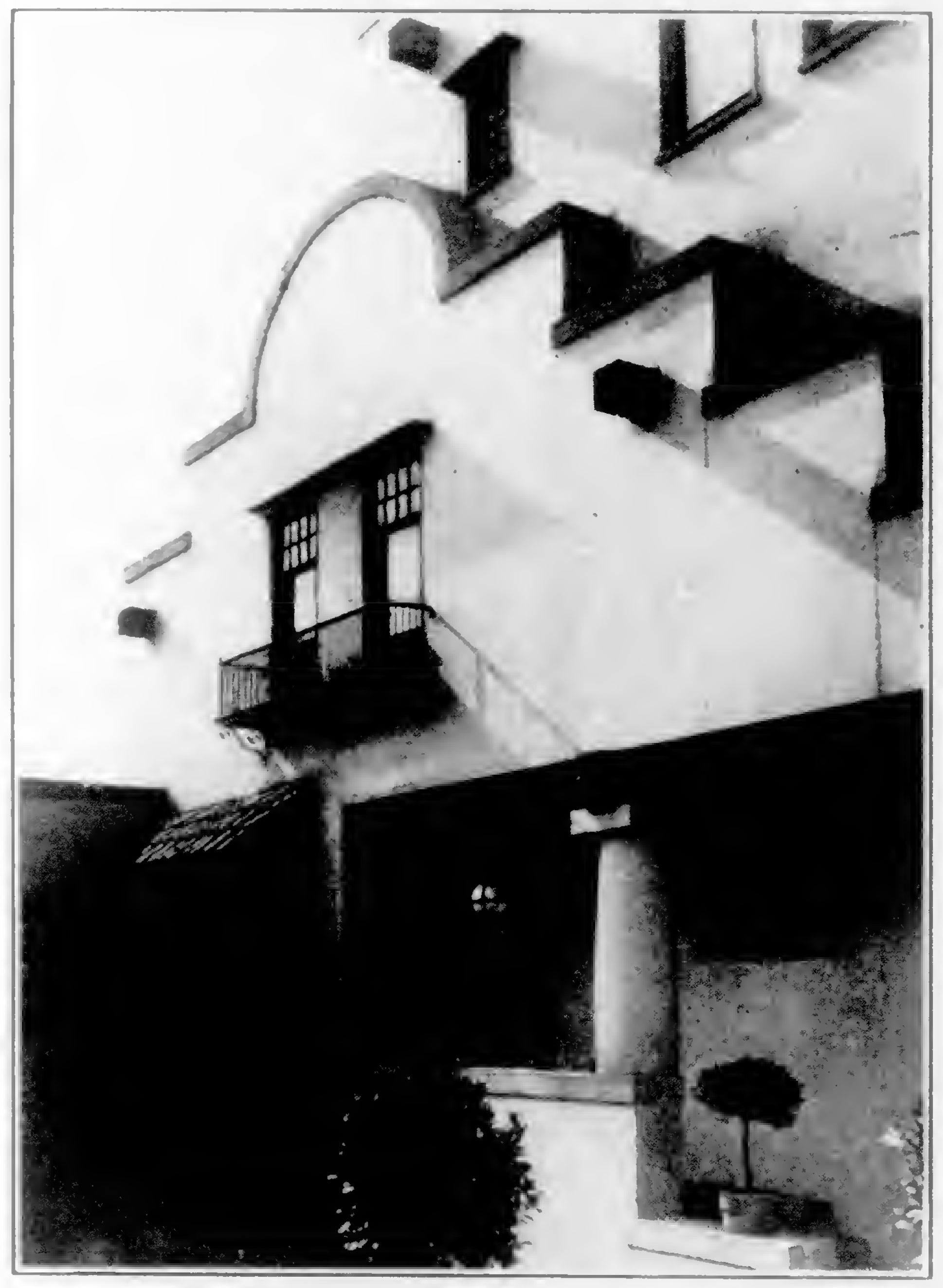

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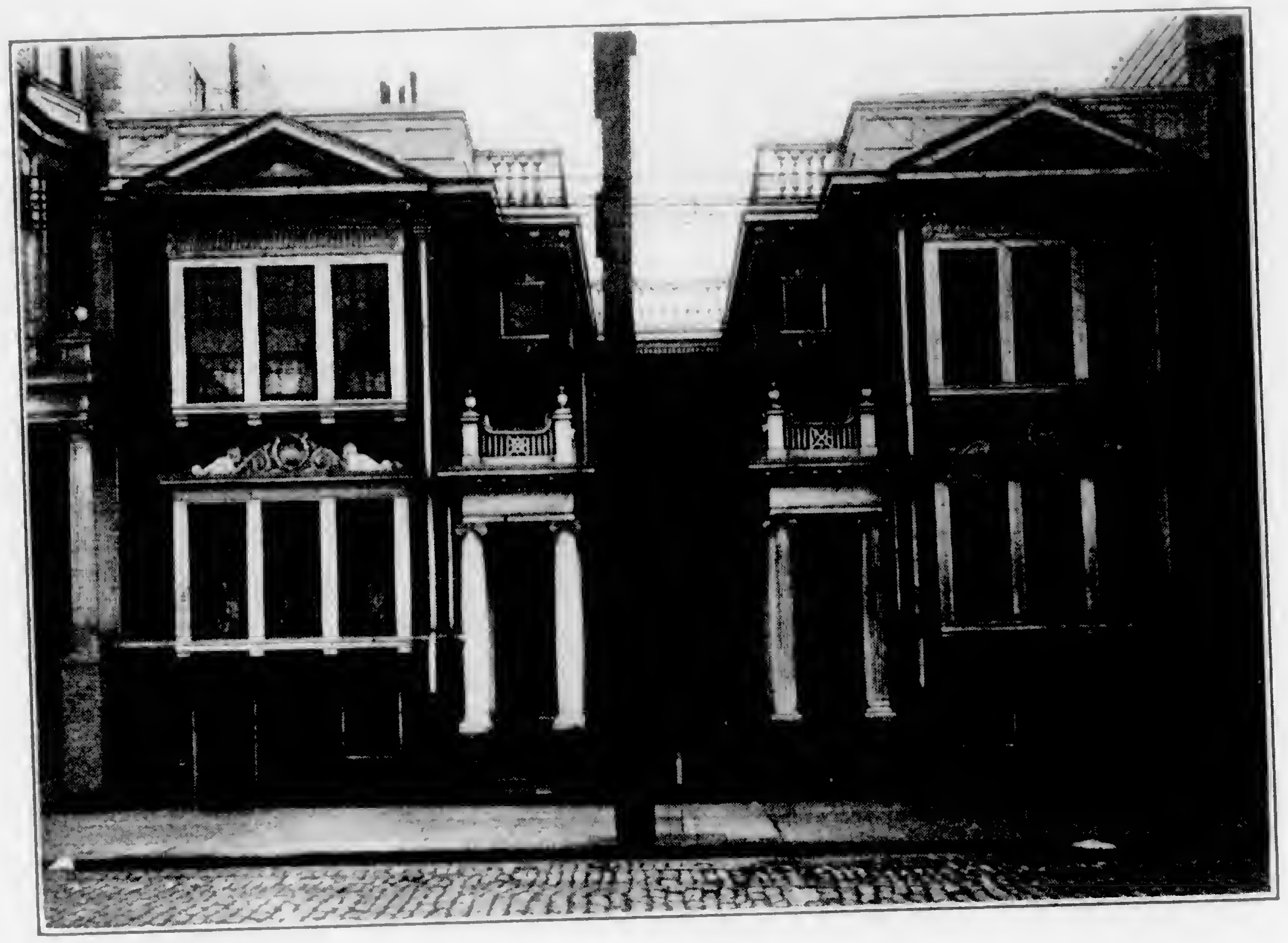

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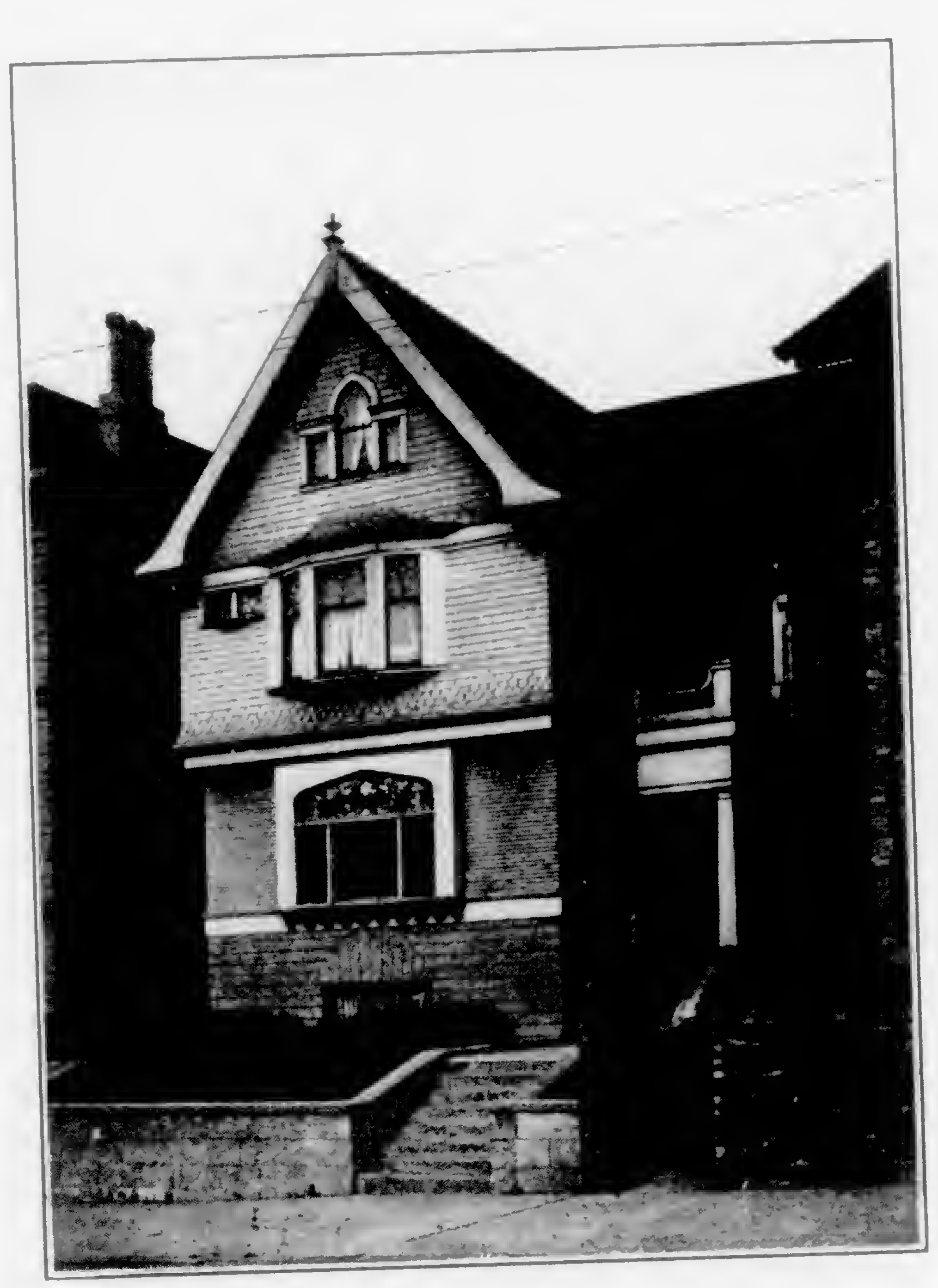

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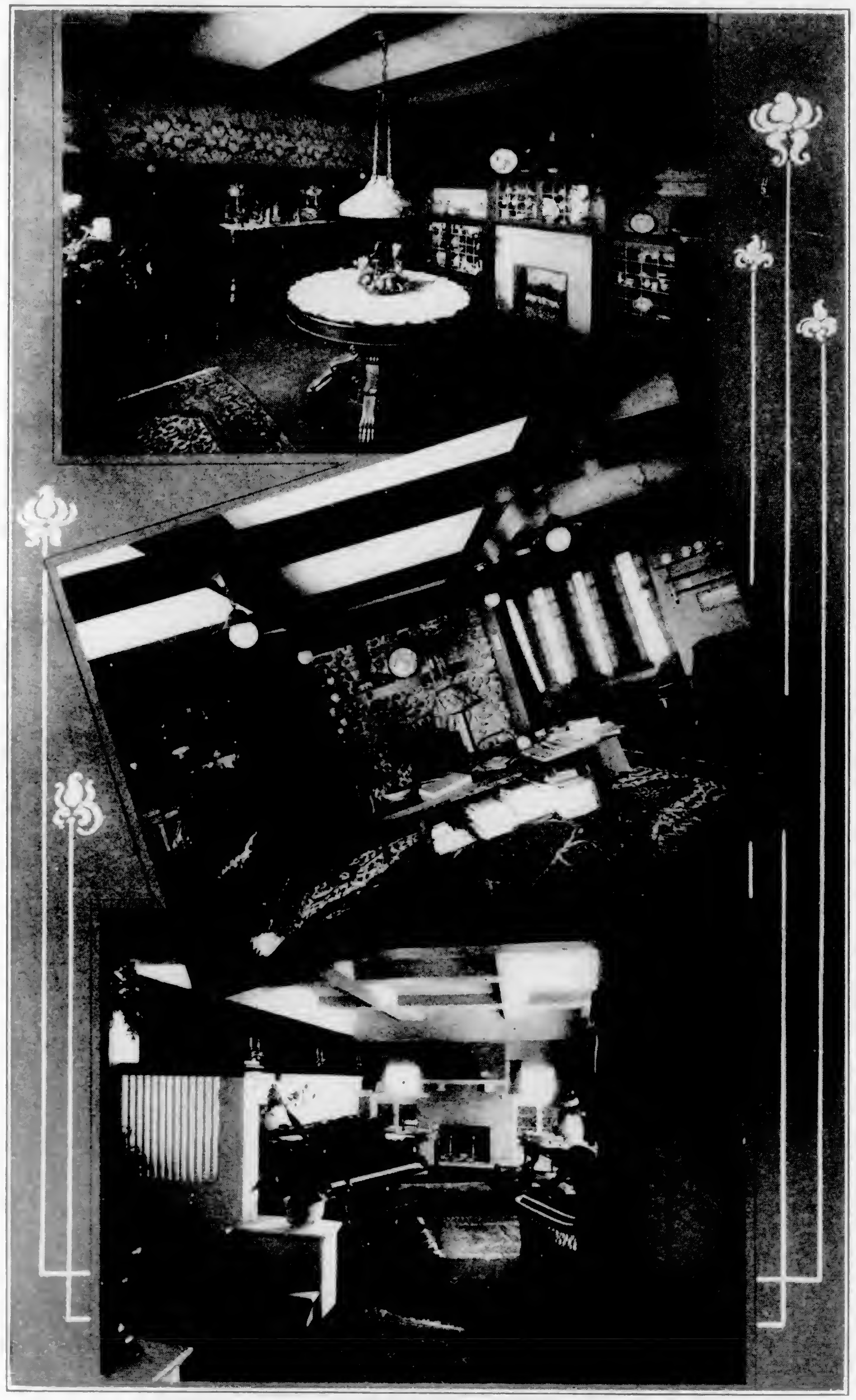
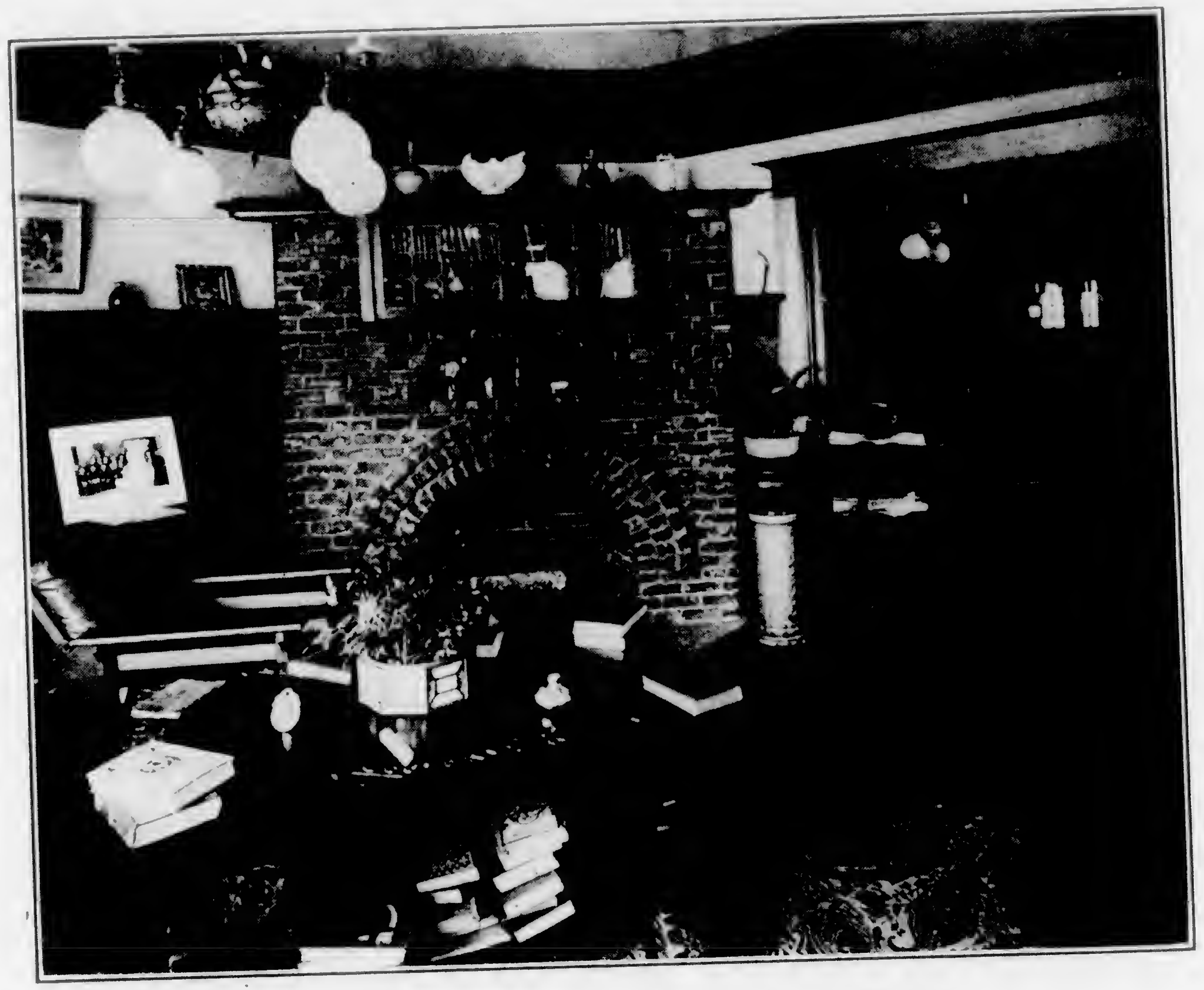
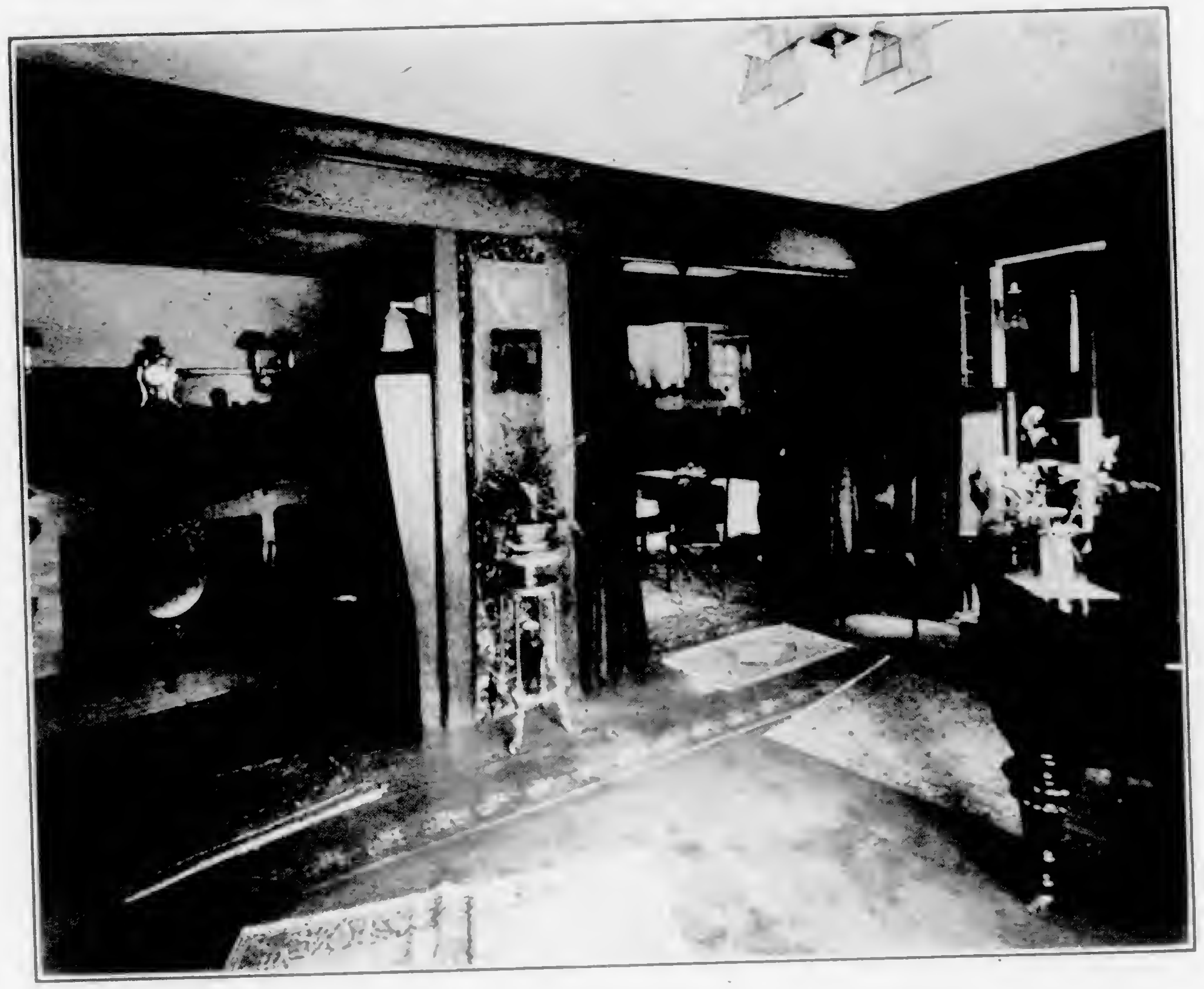


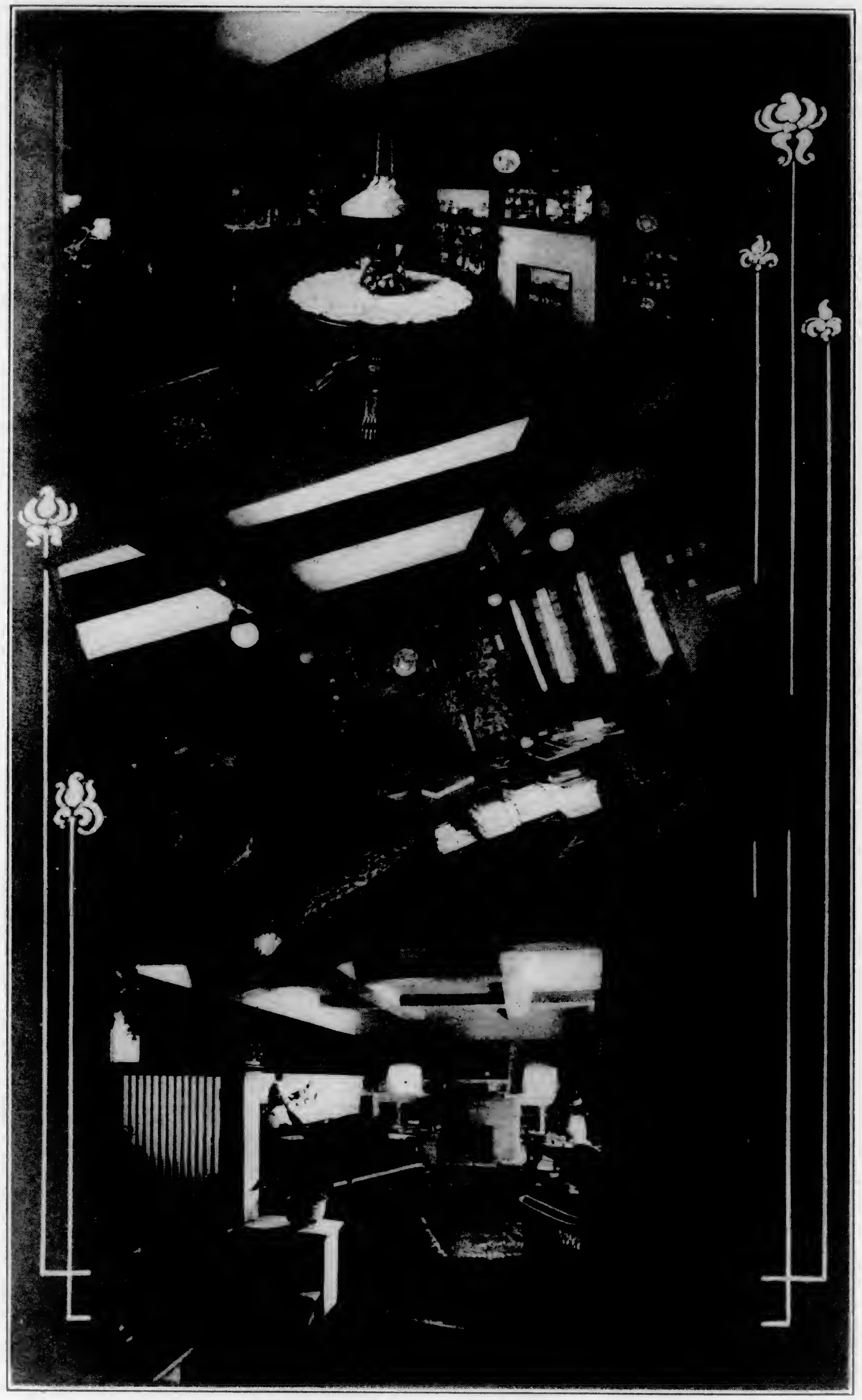
Residence of Henry C. Smith, San Francisco
Dining Room, Den and Living Room



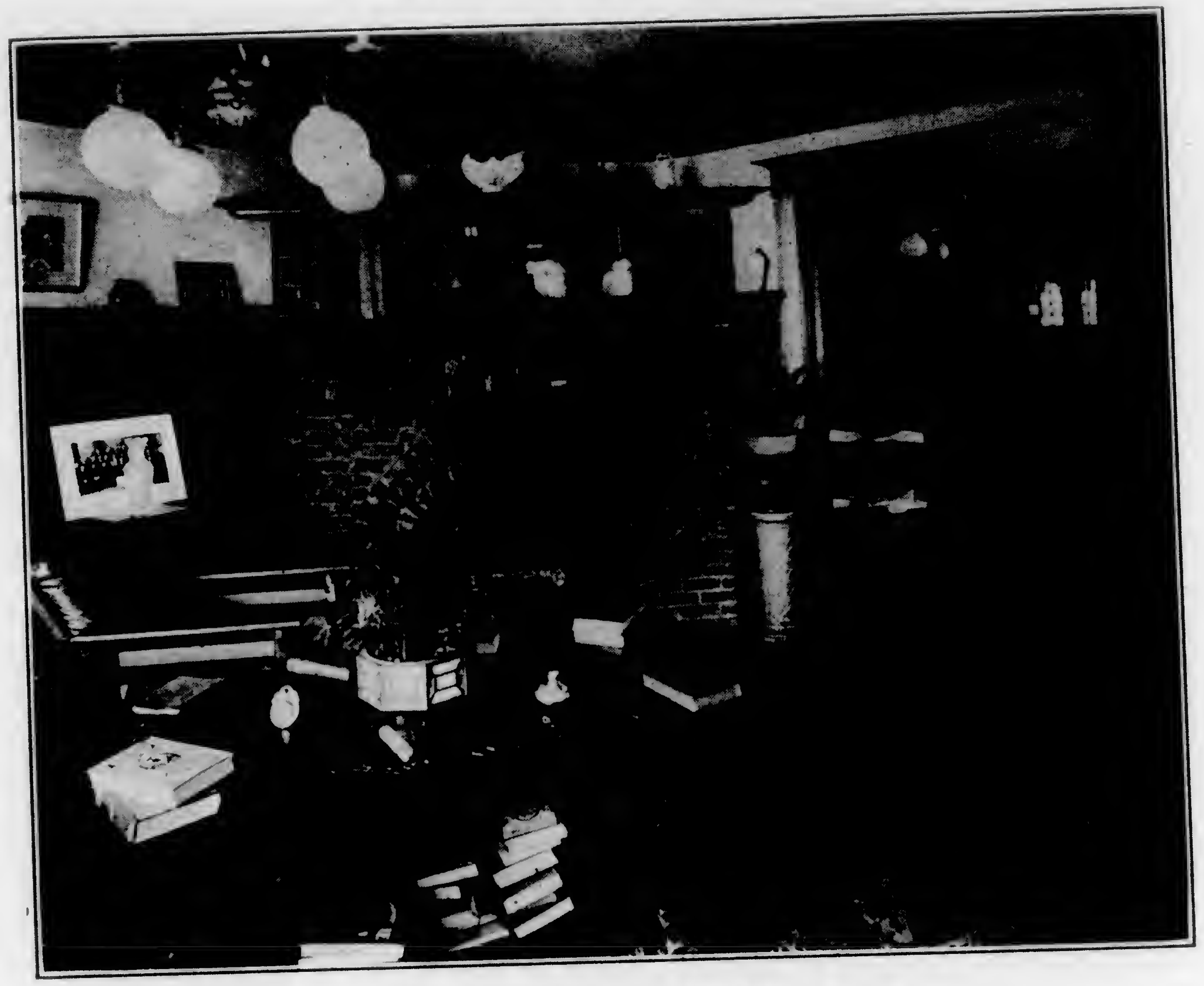
Living Room in Mrs. Kollman's Residence, San Francisco
Louis S. Stone and Henry C. Smith, Architects



Glimpse of the Interior of Mr. Martin Burnell's Residence
Louis S. Stone and Henry C. Smith, Architects



Residence of Henry C. Smith, San Francisco
Dining Room, Den and Living Room



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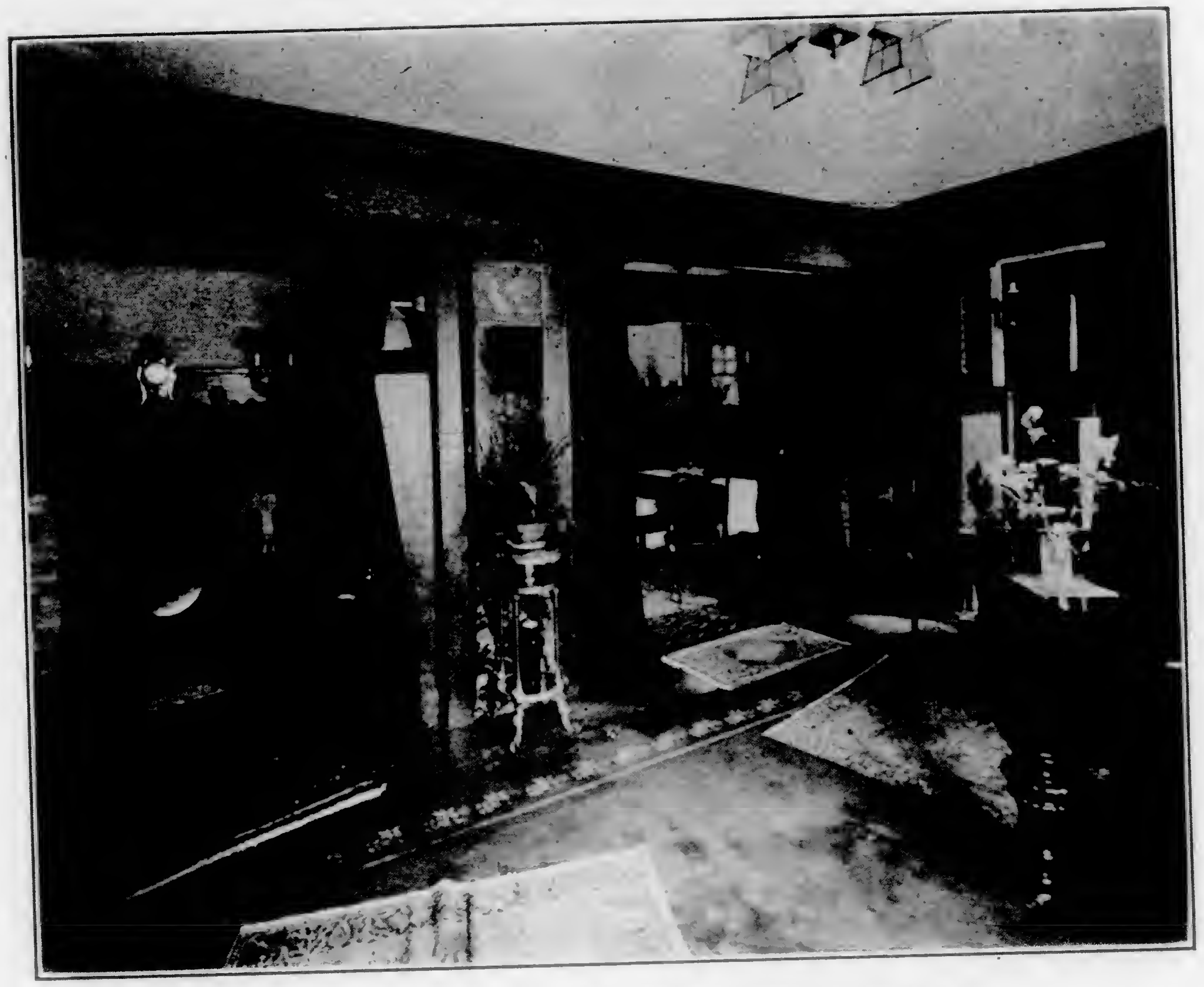

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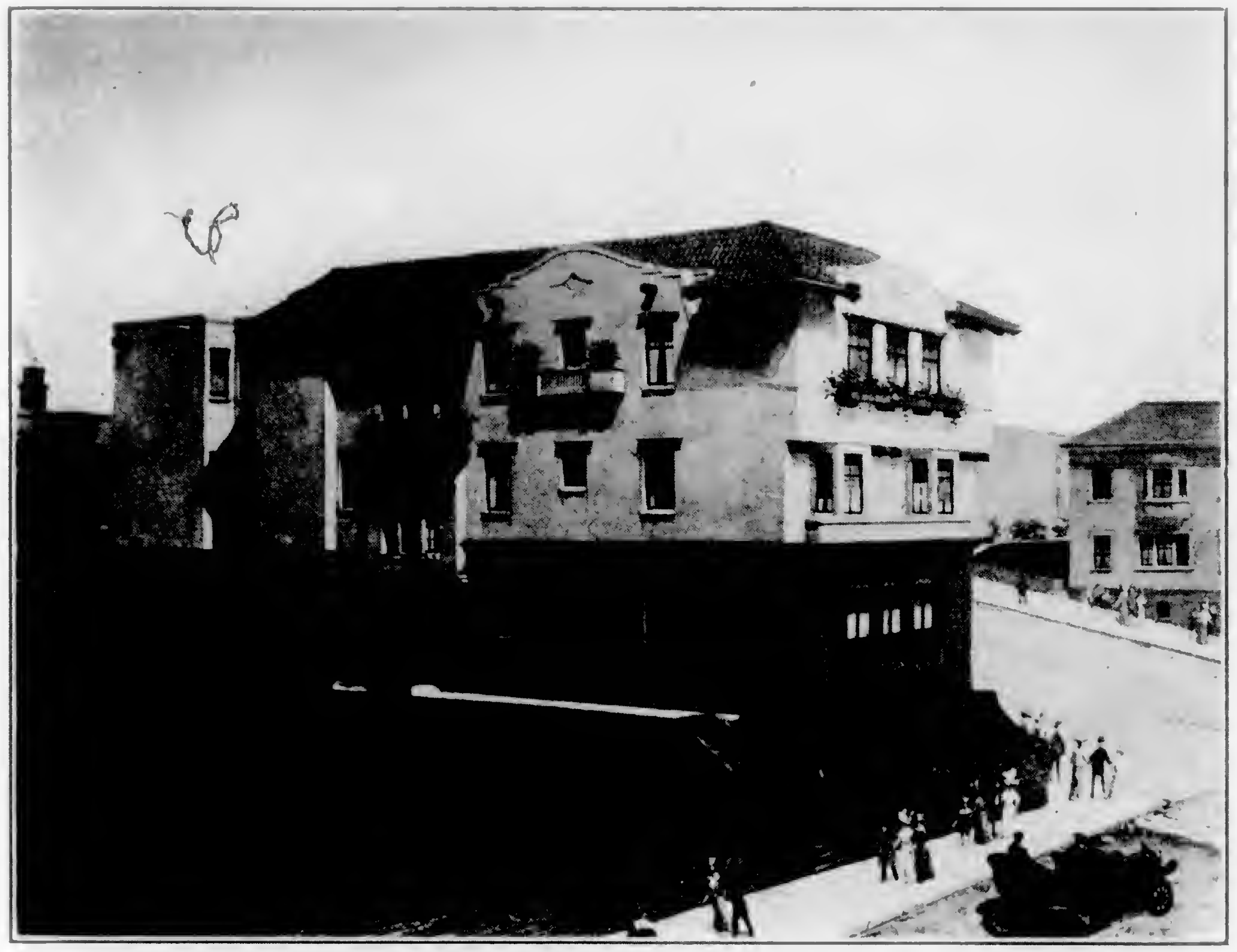
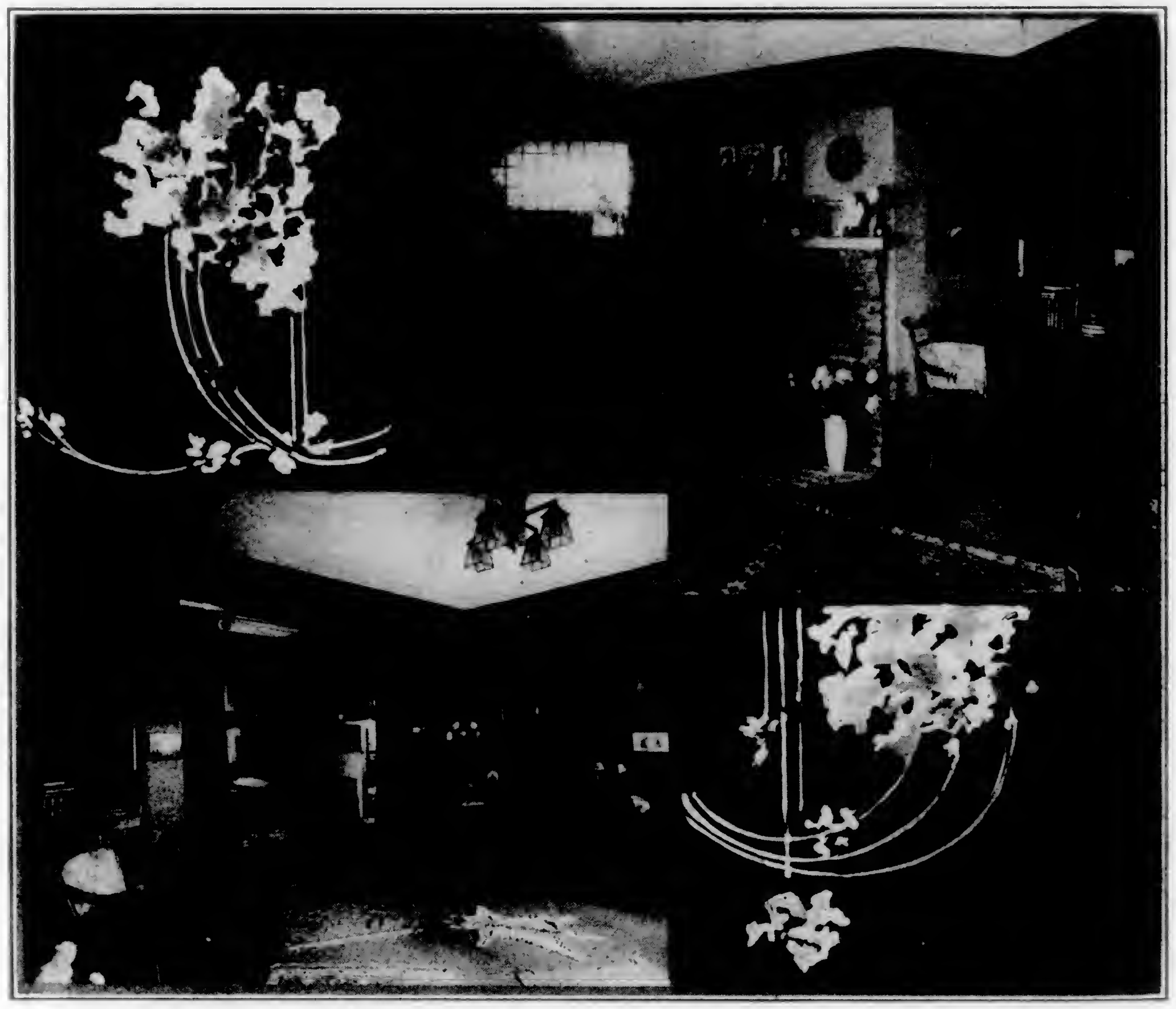
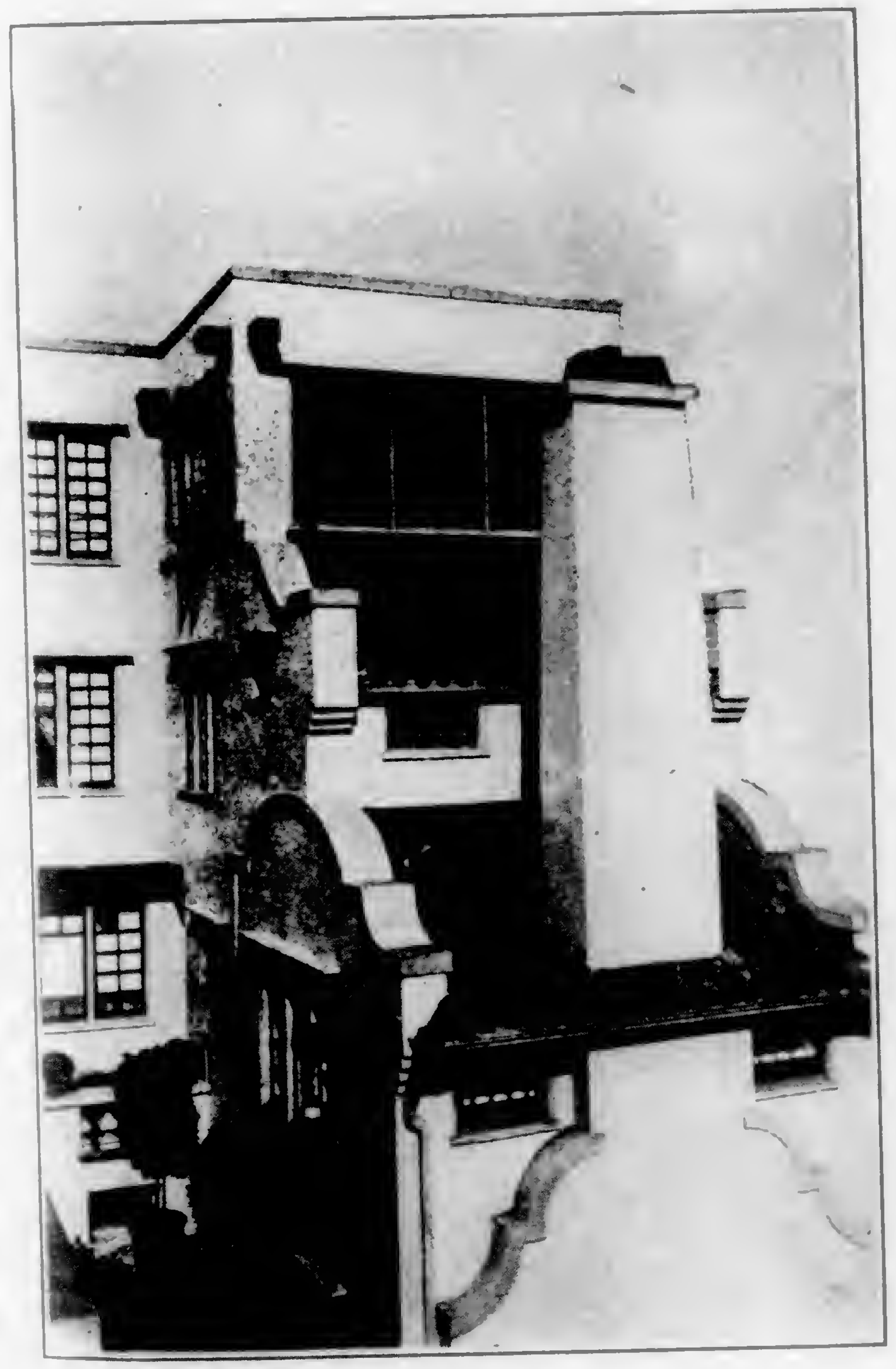


Charles Zeimer Apartments, San Francisco
Louis S. Stone and Henry C. Smith, Architects

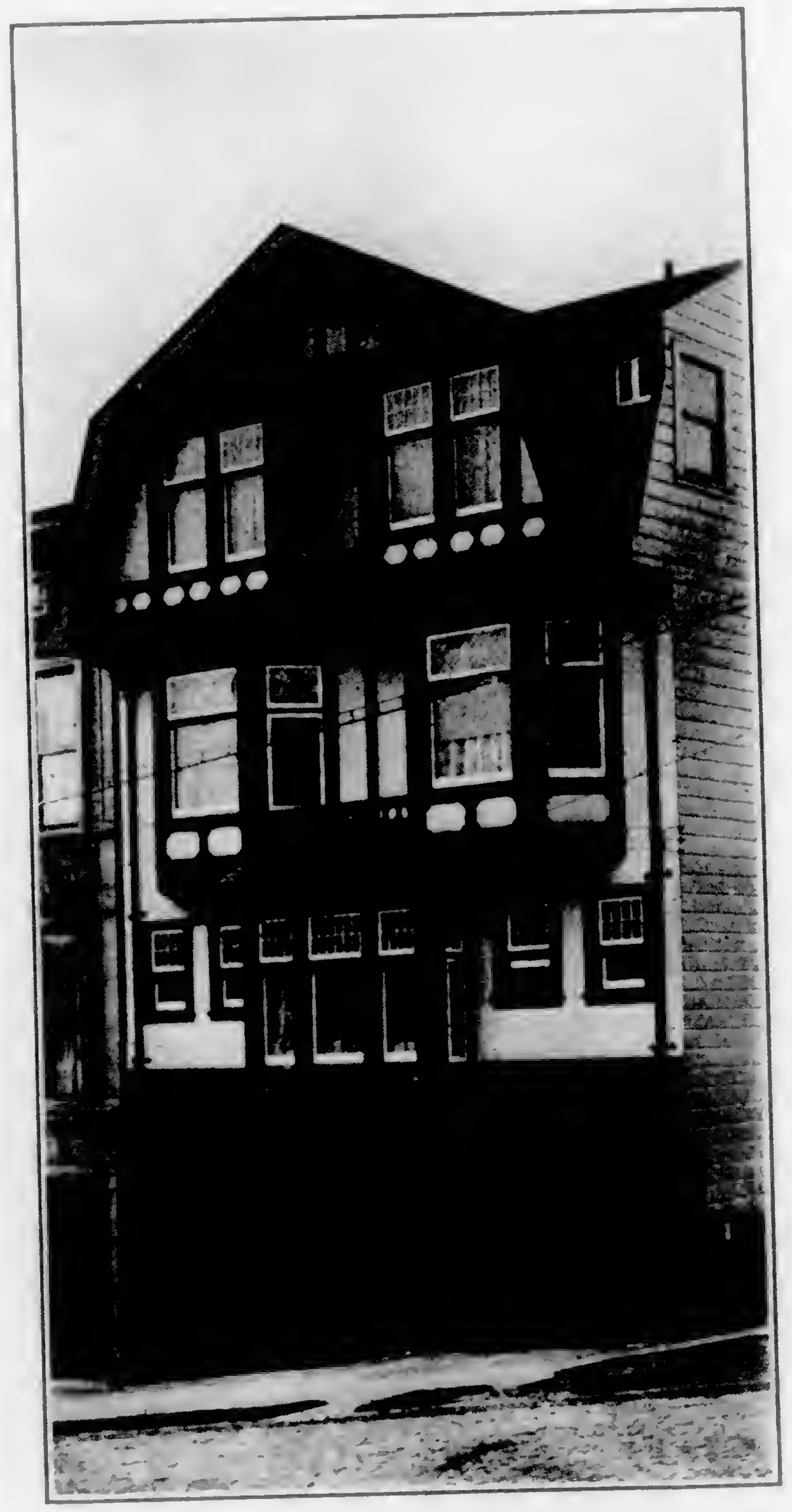


Residence of Mr. J. R. Farrell, San Francisco
Cozy Corner and Living Room
Louis S. Stone and Henry C. Smith, Architects

Apartment House, Oakland
Louis S. Stone and Henry C. Smith, Architects

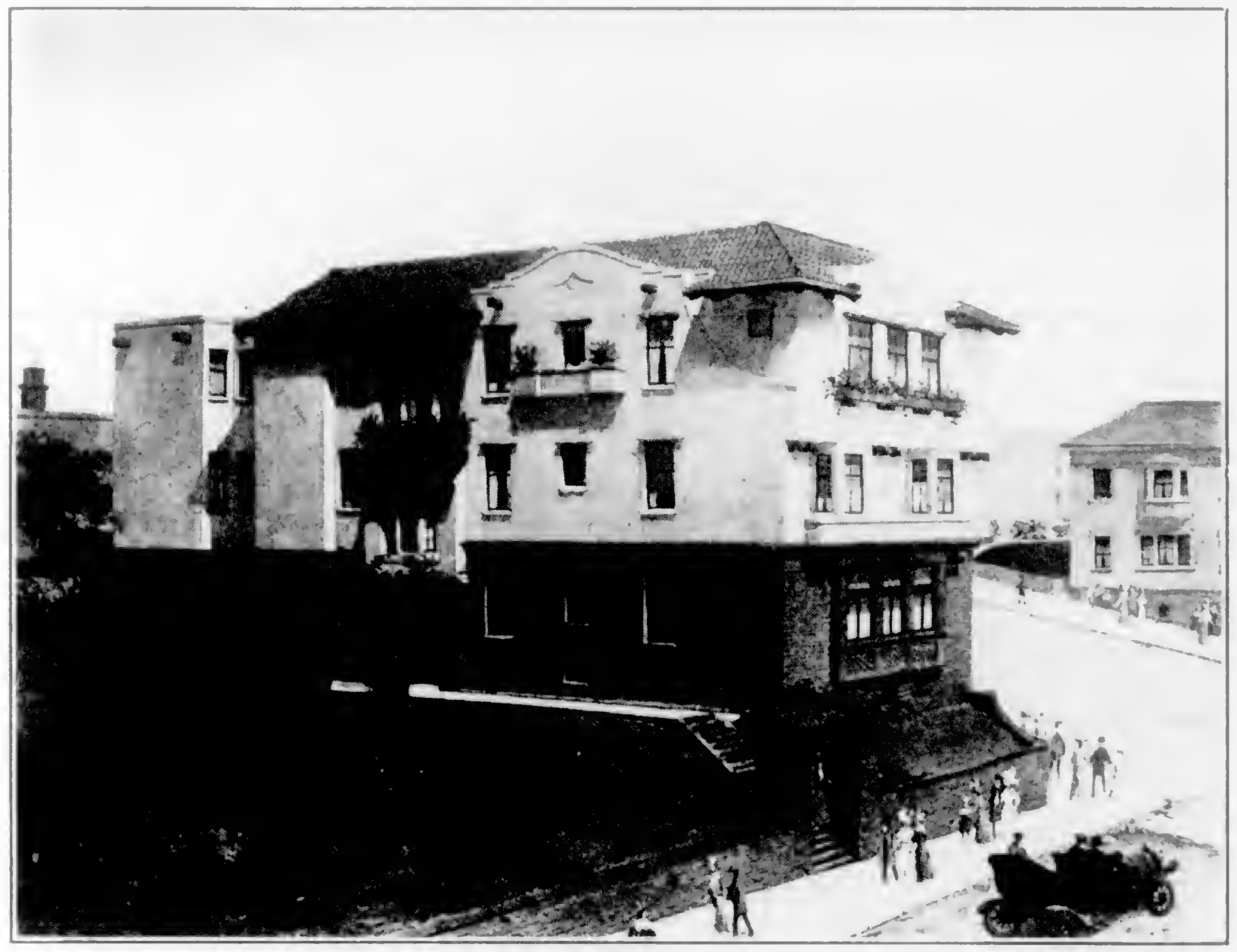


Unusual Roof Treatment in the Old Mission

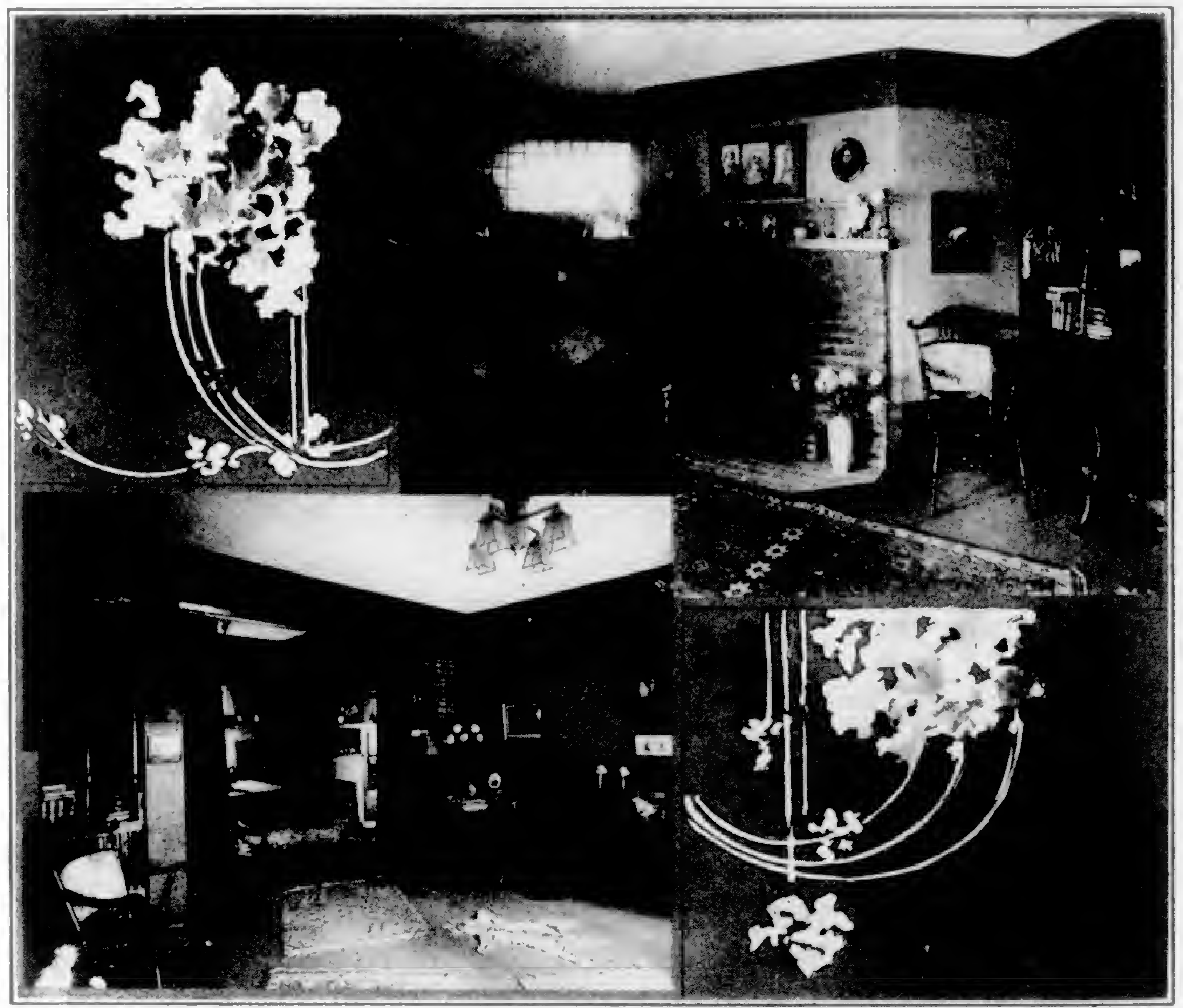


"The Maple" Apartments, San Francisco

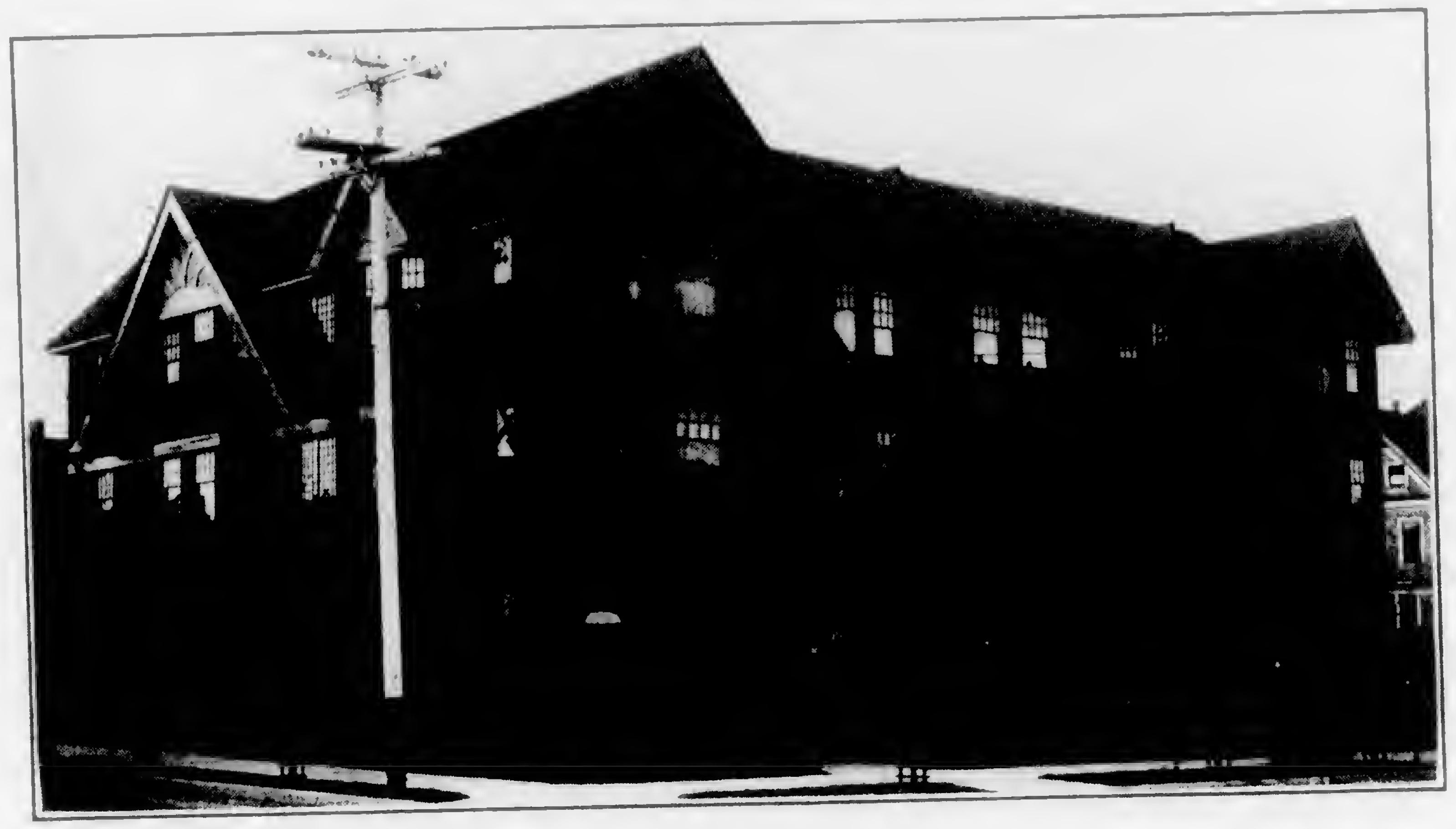
Louis S. Stone and Henry C. Smith, Architects



Charles Zeimer Apartments, San Francisco
Louis S. Stone and Henry C. Smith, Architects



Residence of Mr. J. R. Farrell, San Francisco
Cozy Corner and Living Room
Louis S. Stone and Henry C. Smith, Architects



Apartment House, Oakland
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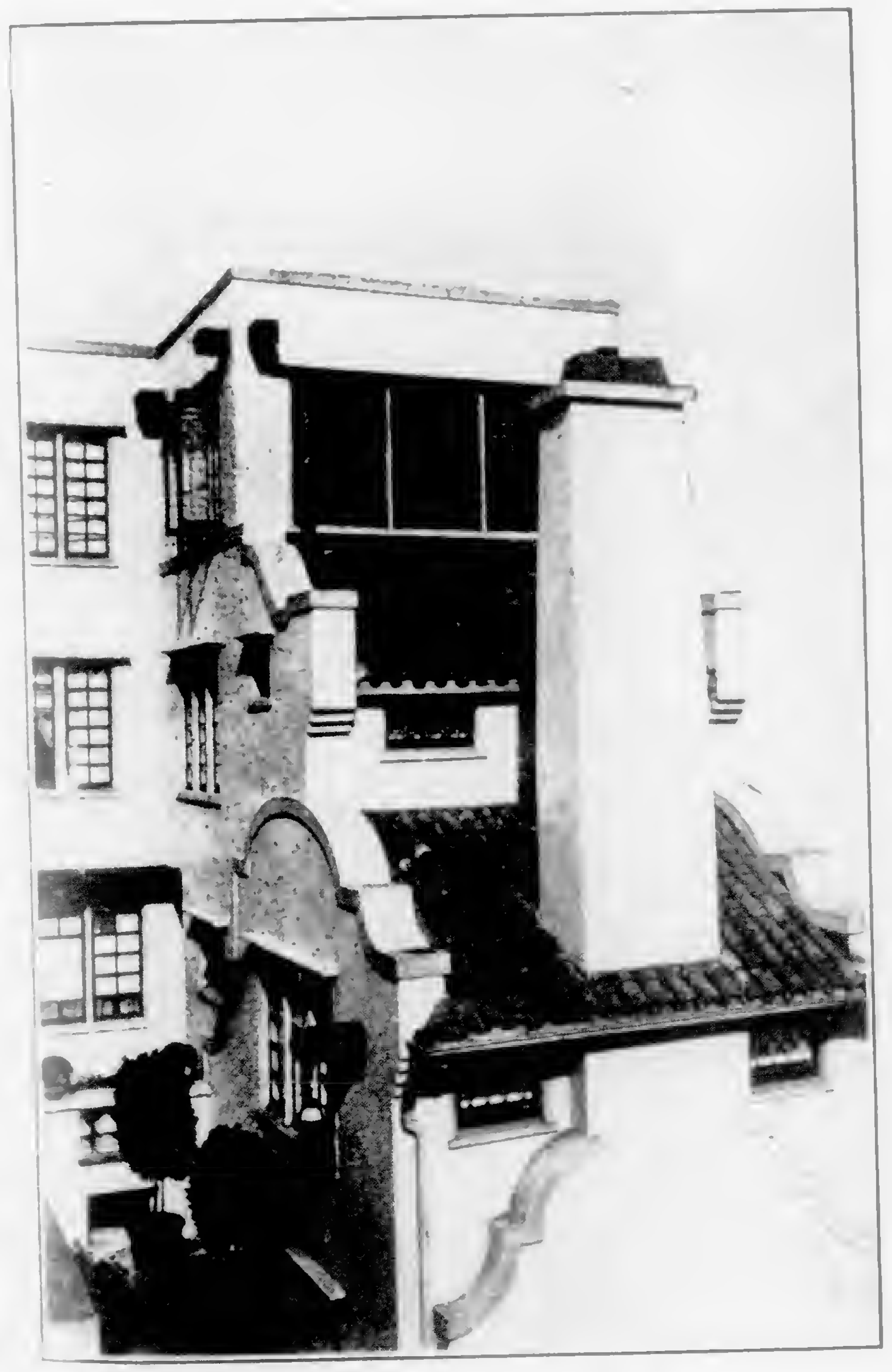

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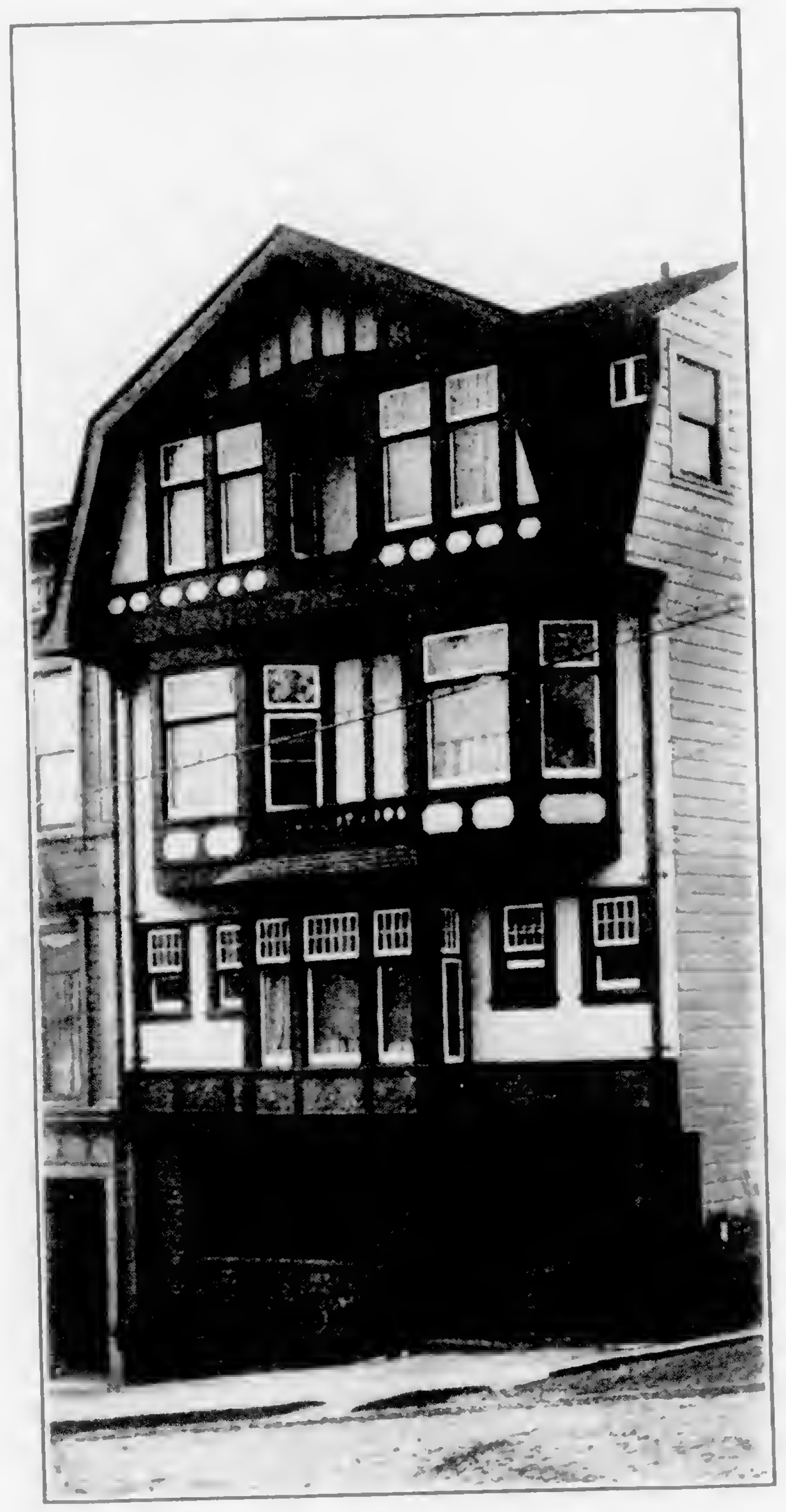

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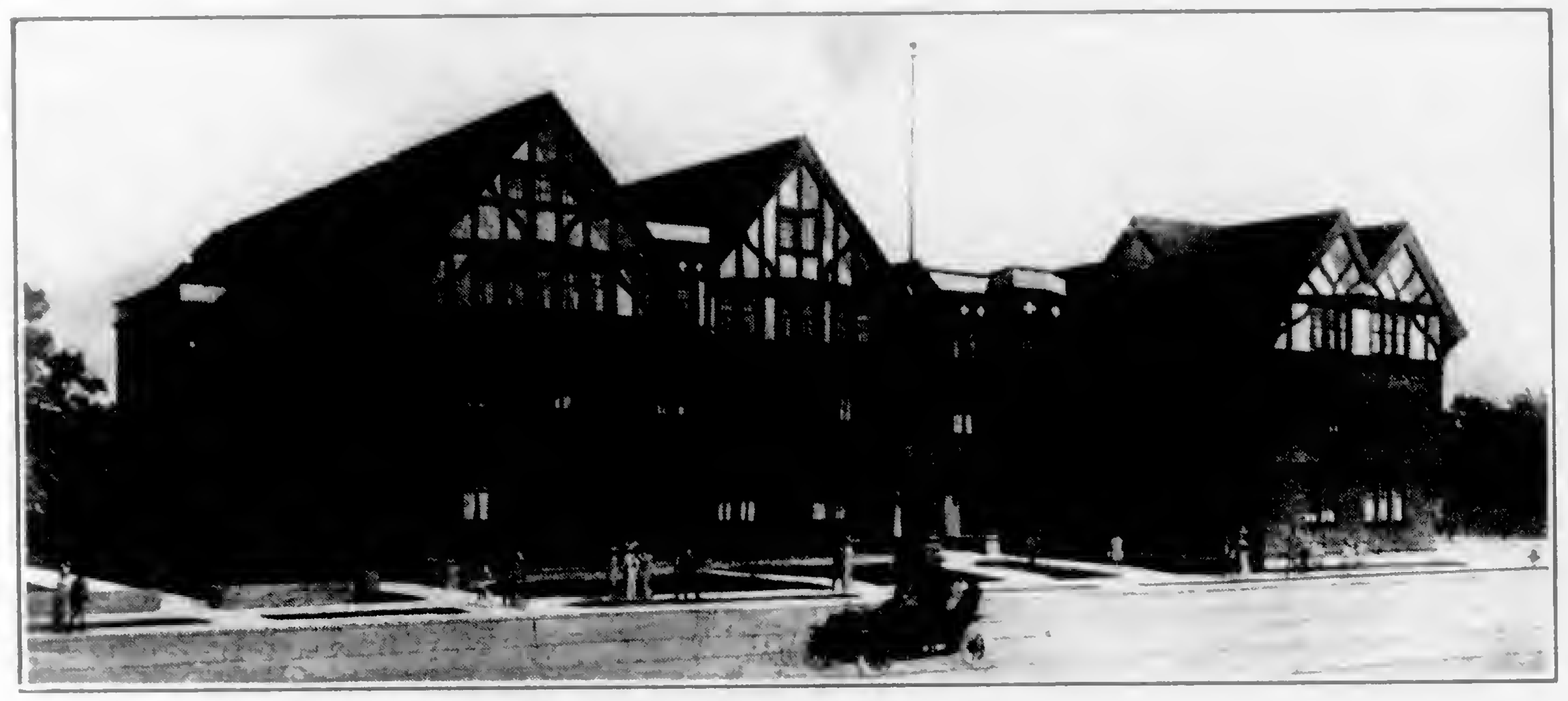
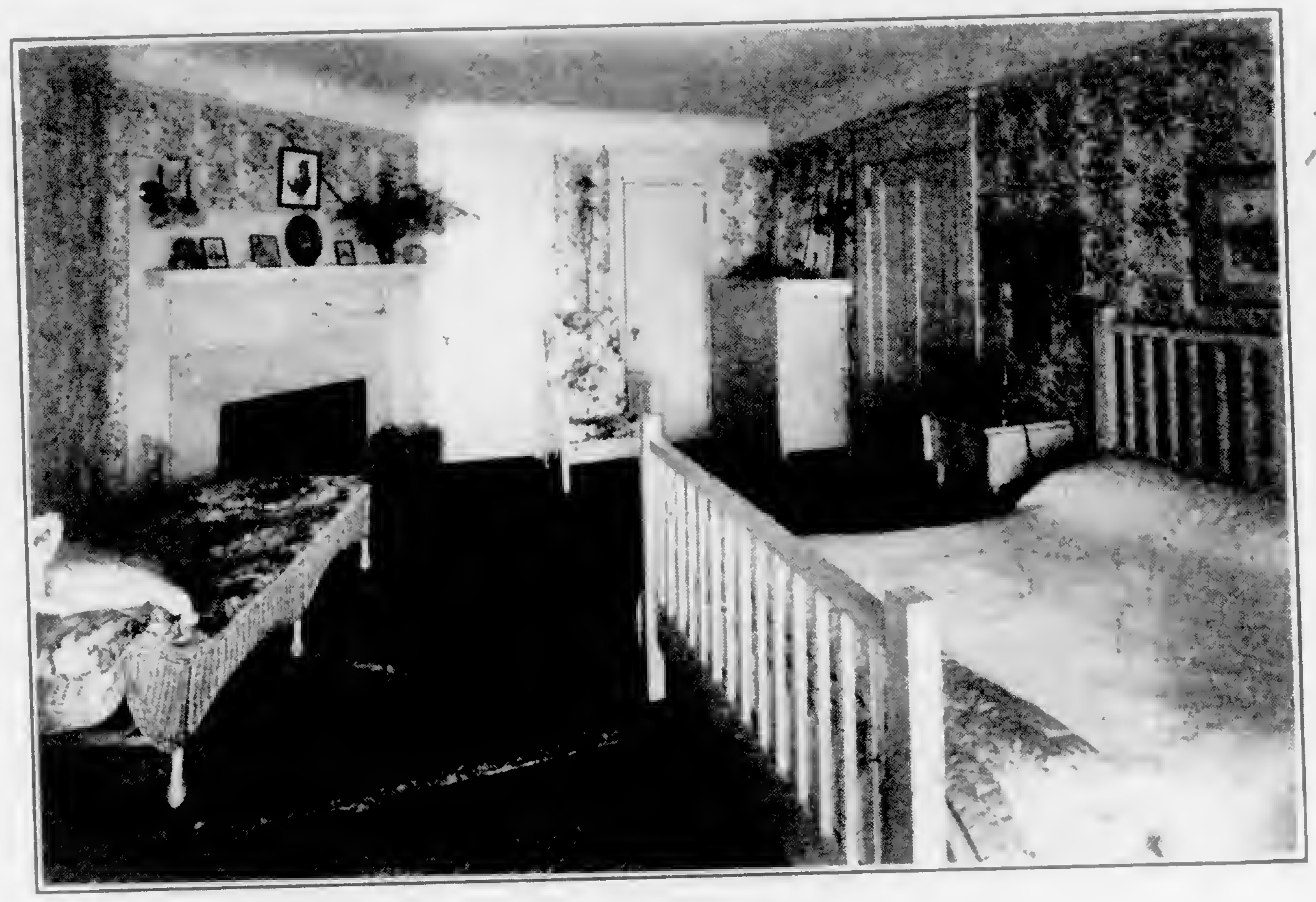
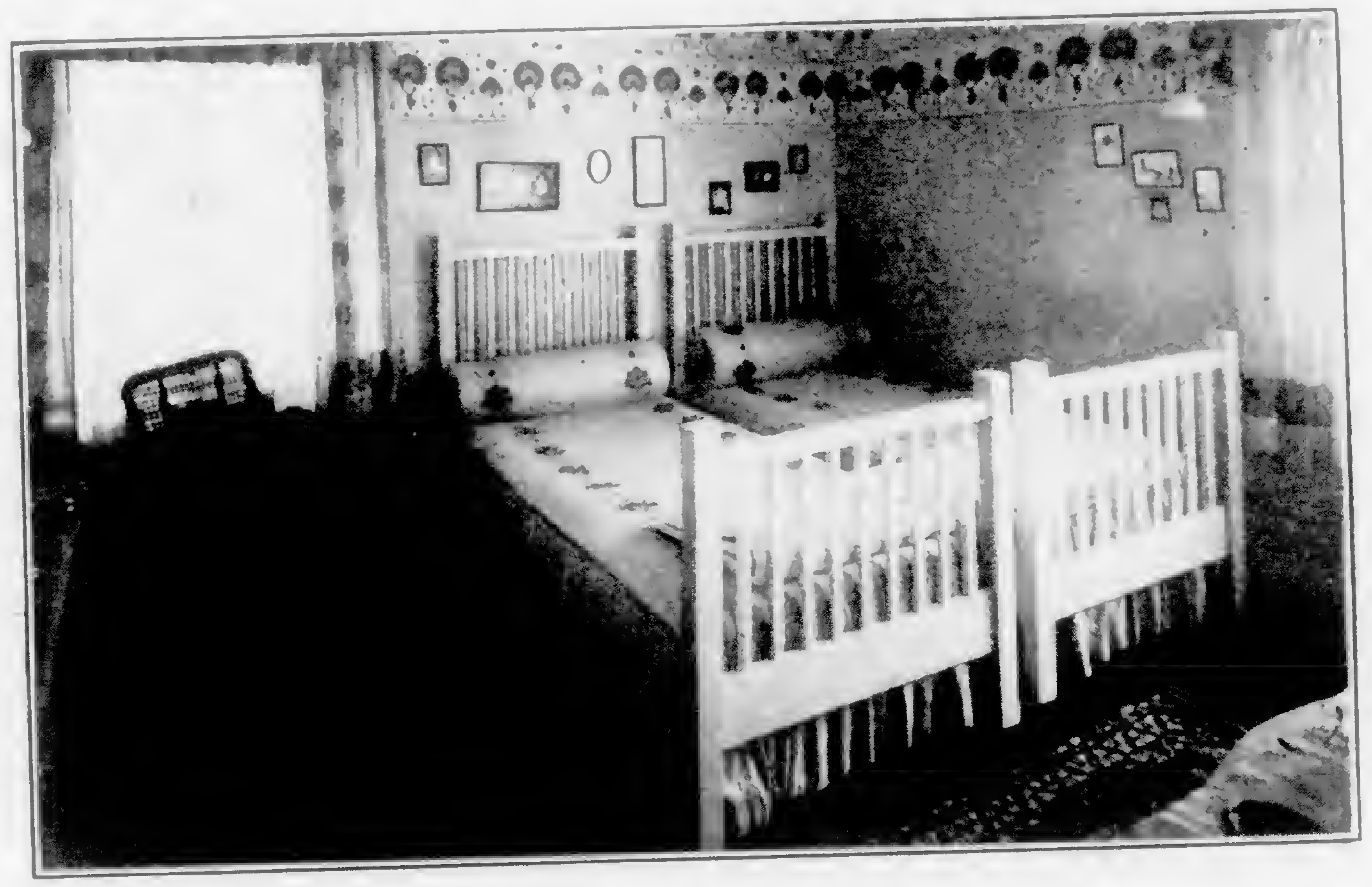


Anstone Apartments, Oakland, Cal.
Louis S. Stone and Henry C. Smith, Architects

Fireplace in Studio of Ada Romer-Shawhan
Louis S. Stone and Henry C. Smith, Architects



An Attractive Bedroom with Open Fireplace
Louis S. Stone and Henry C. Smith, Architects



A Child's Bedroom
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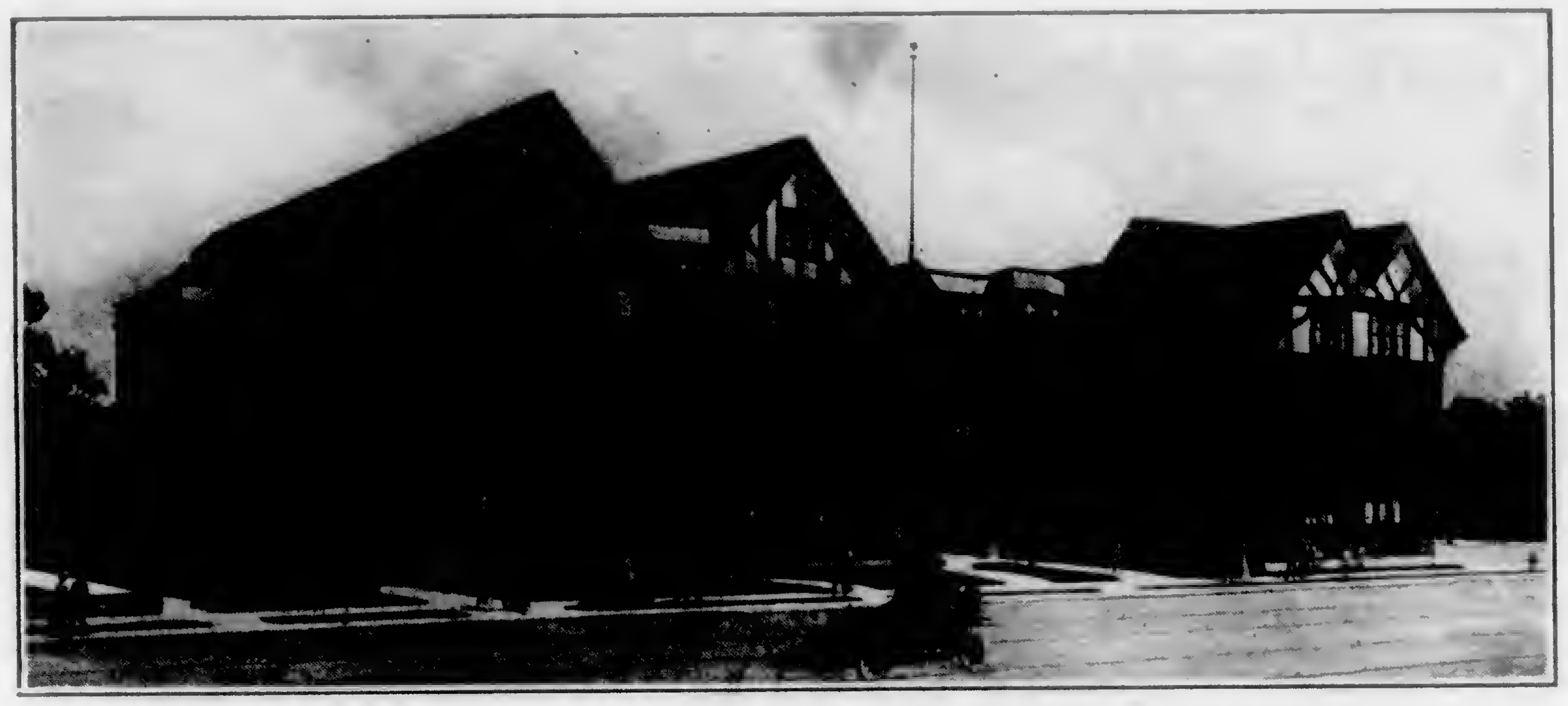

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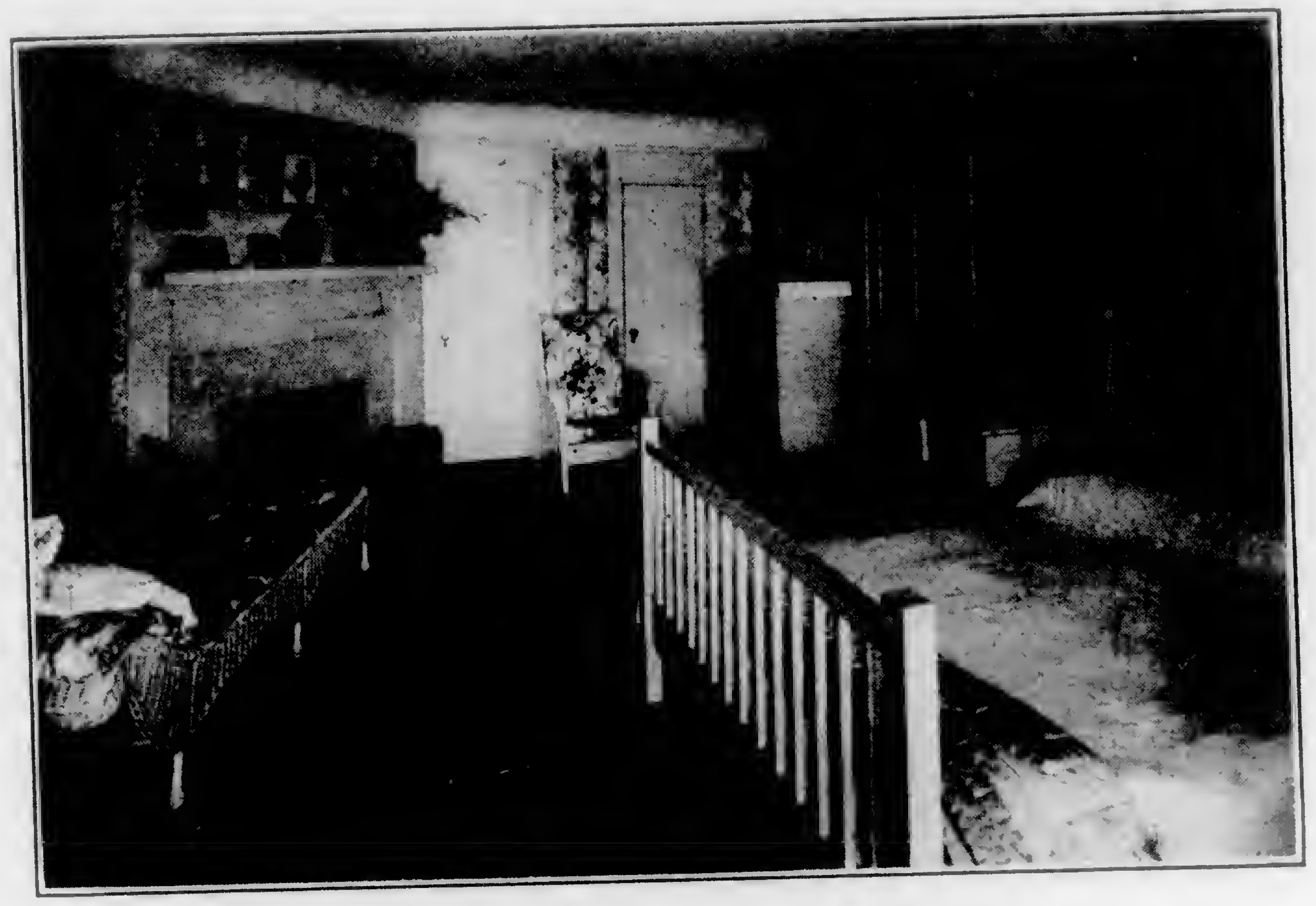

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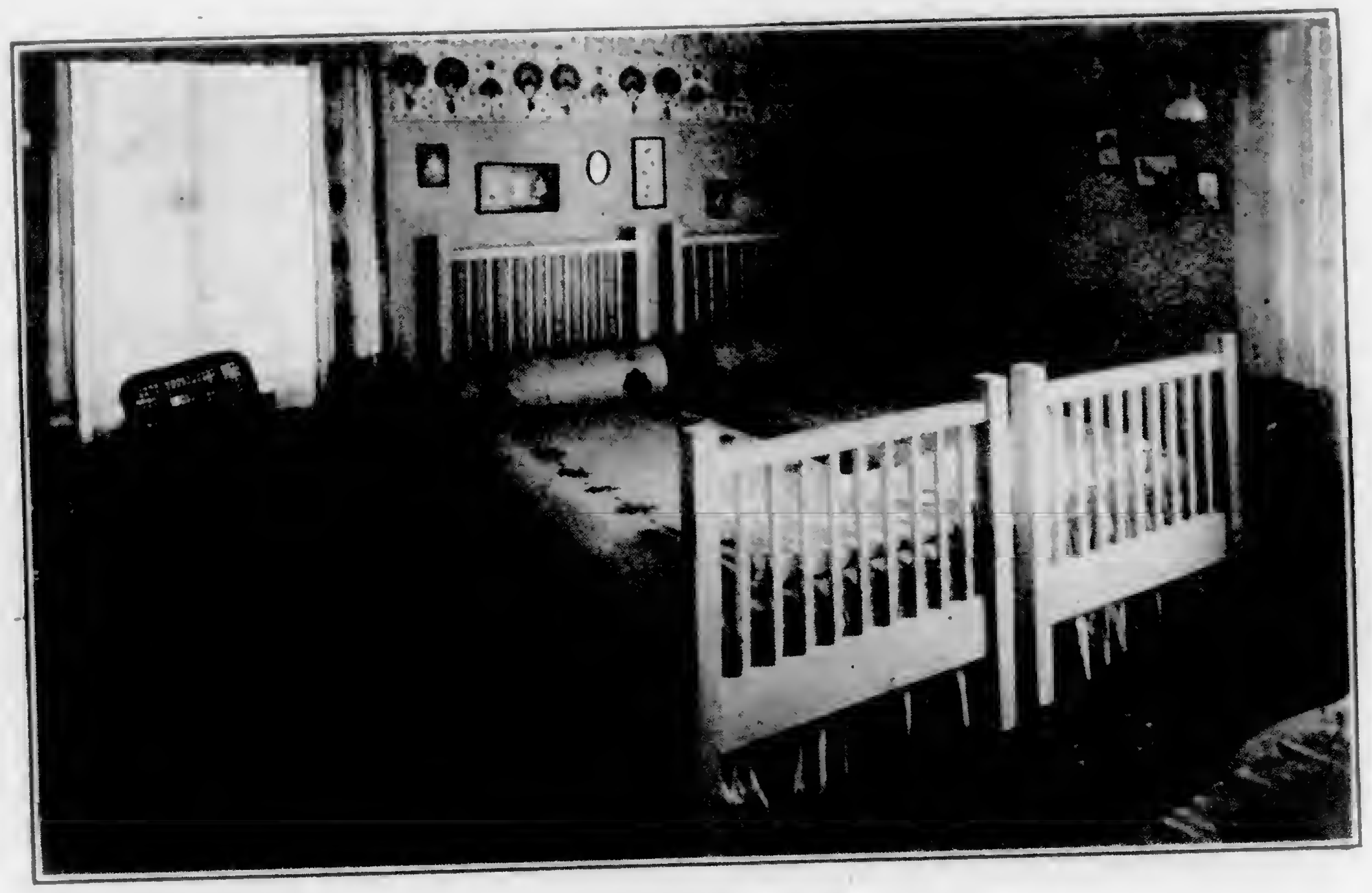

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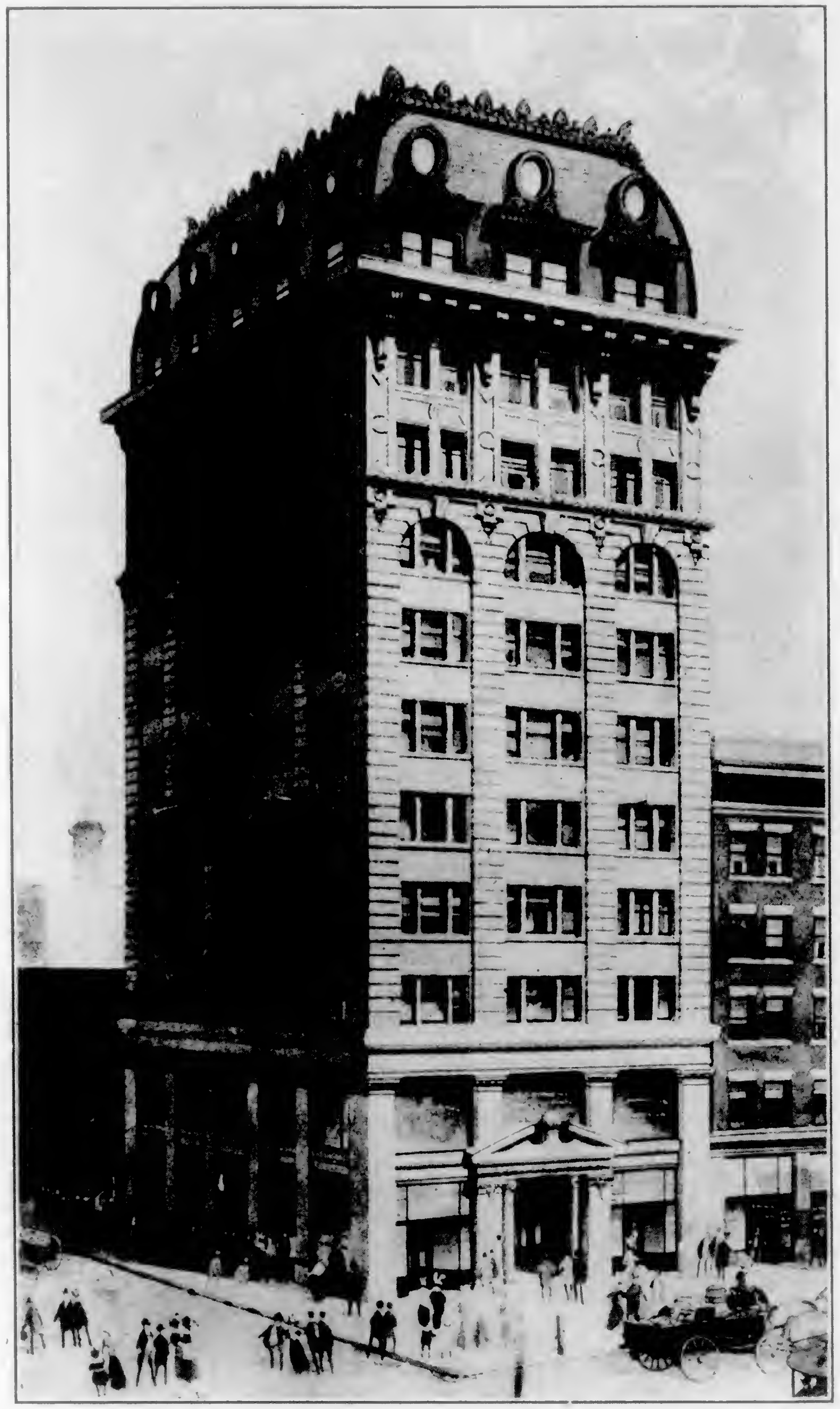
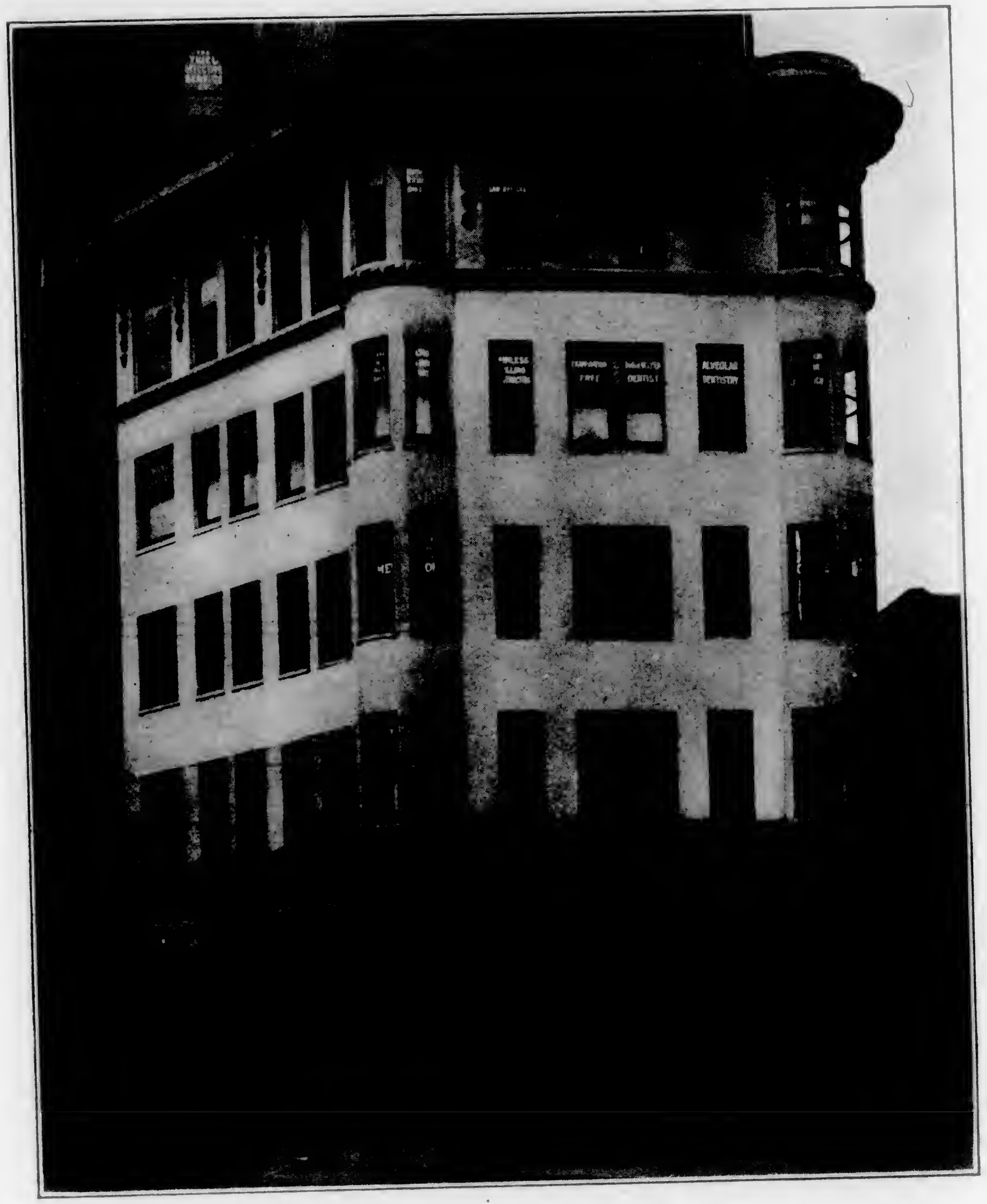
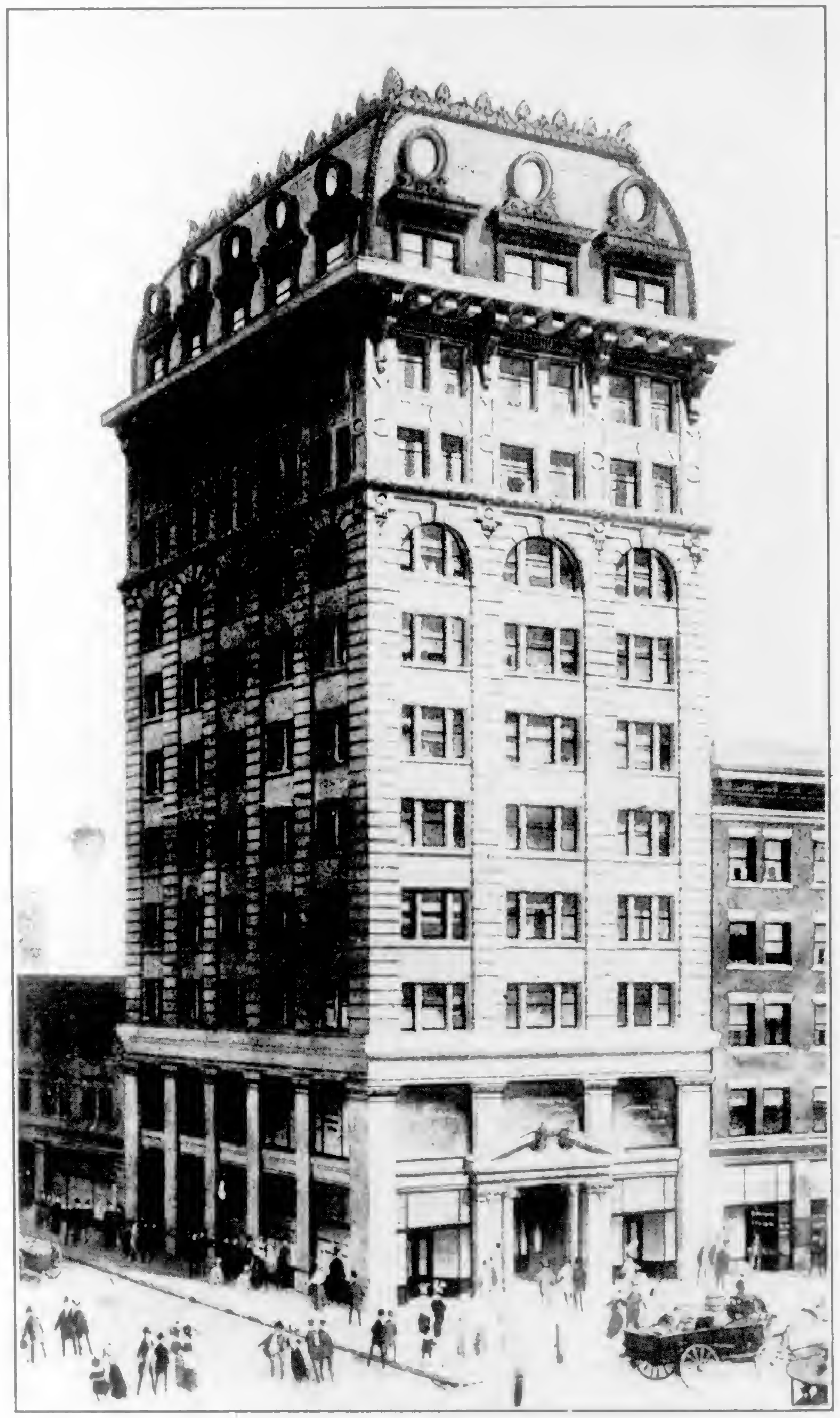


Proposed Building, Fourth Street, near Market, San Francisco
Louis S. Stone and Henry C. Smith, Architects



Flannery Building, San Francisco. Designed for Three Additional Stories.
Equipped with Otis Elevators
Louis S. Stone and Henry C. Smith, Architects



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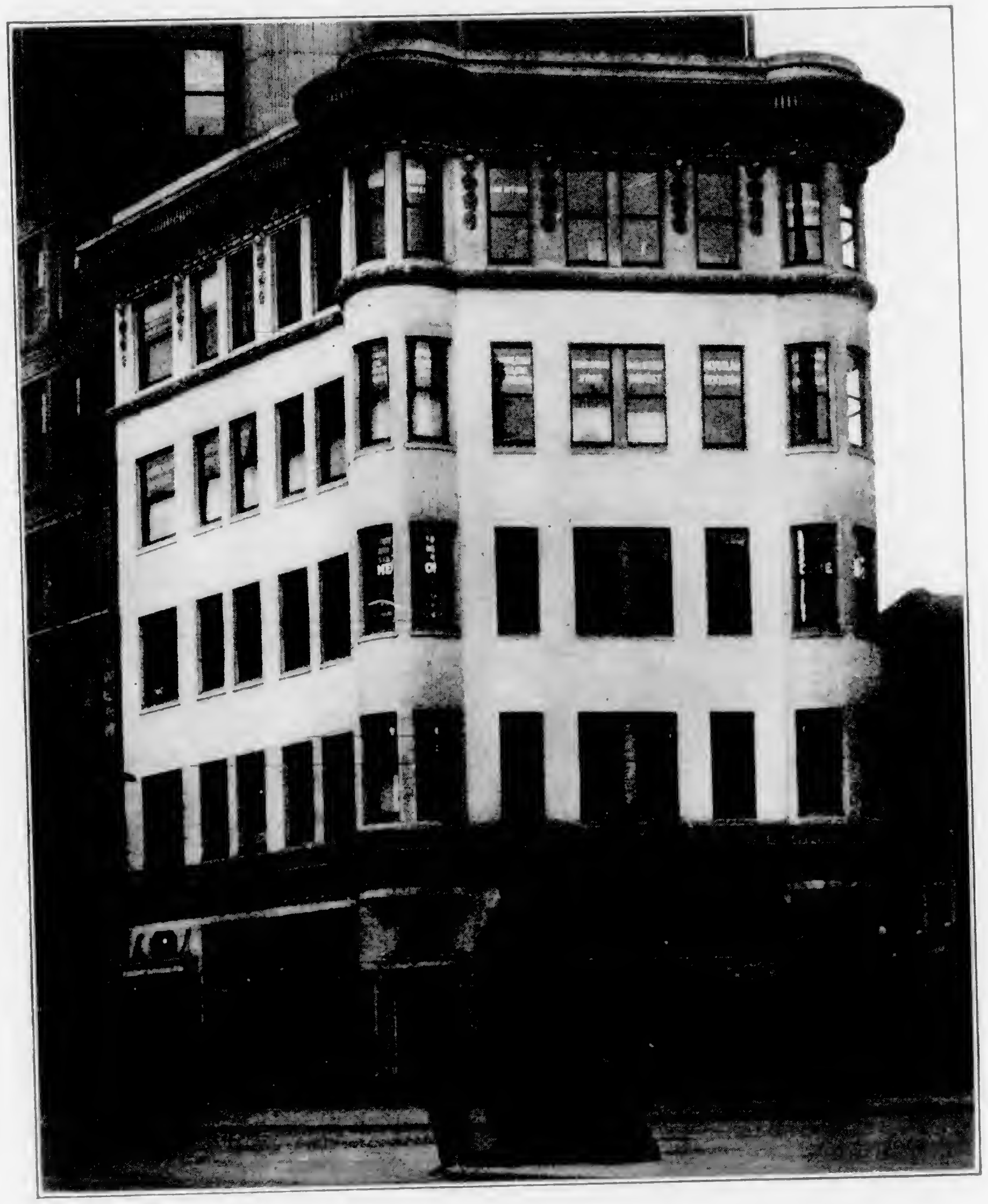

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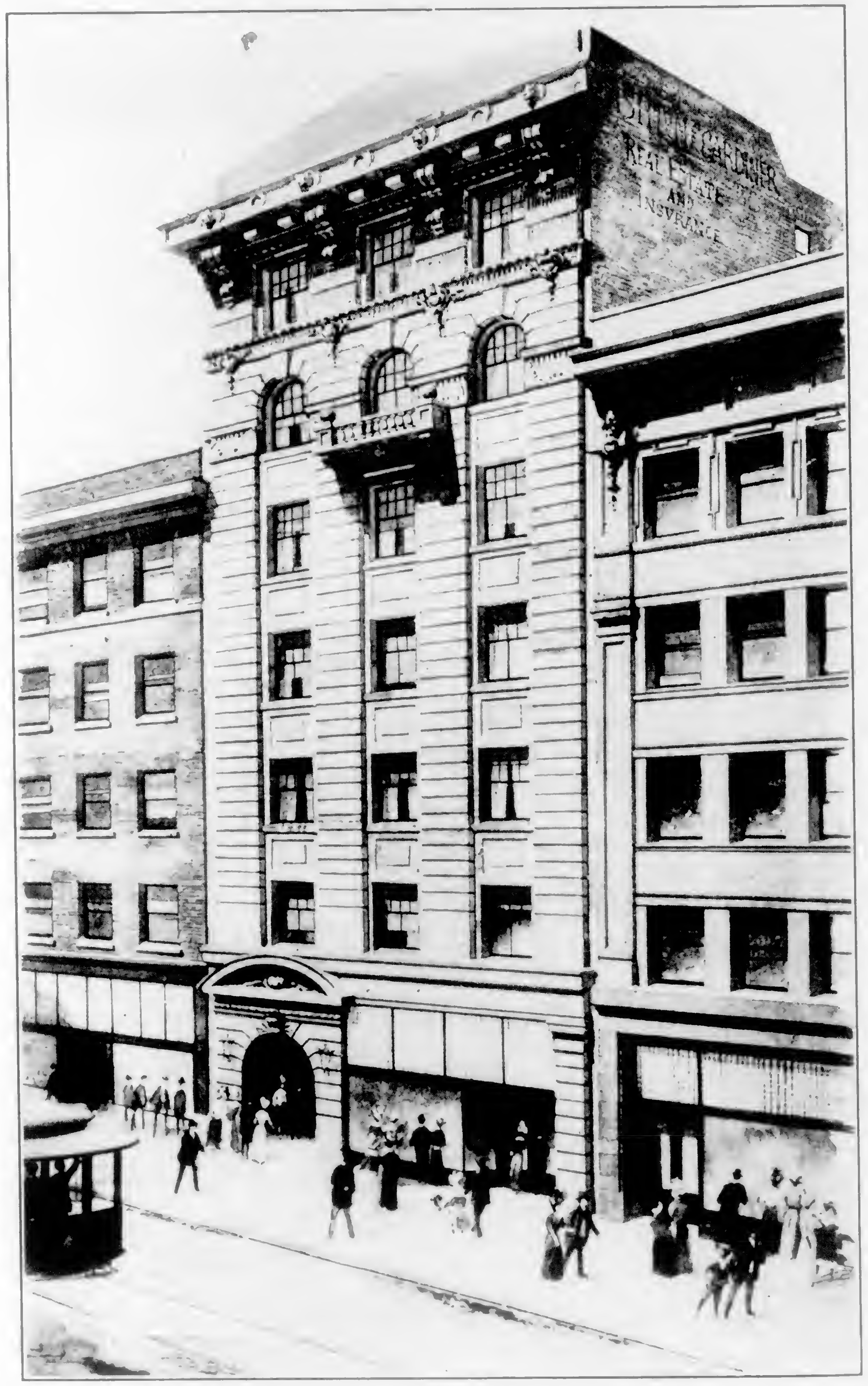
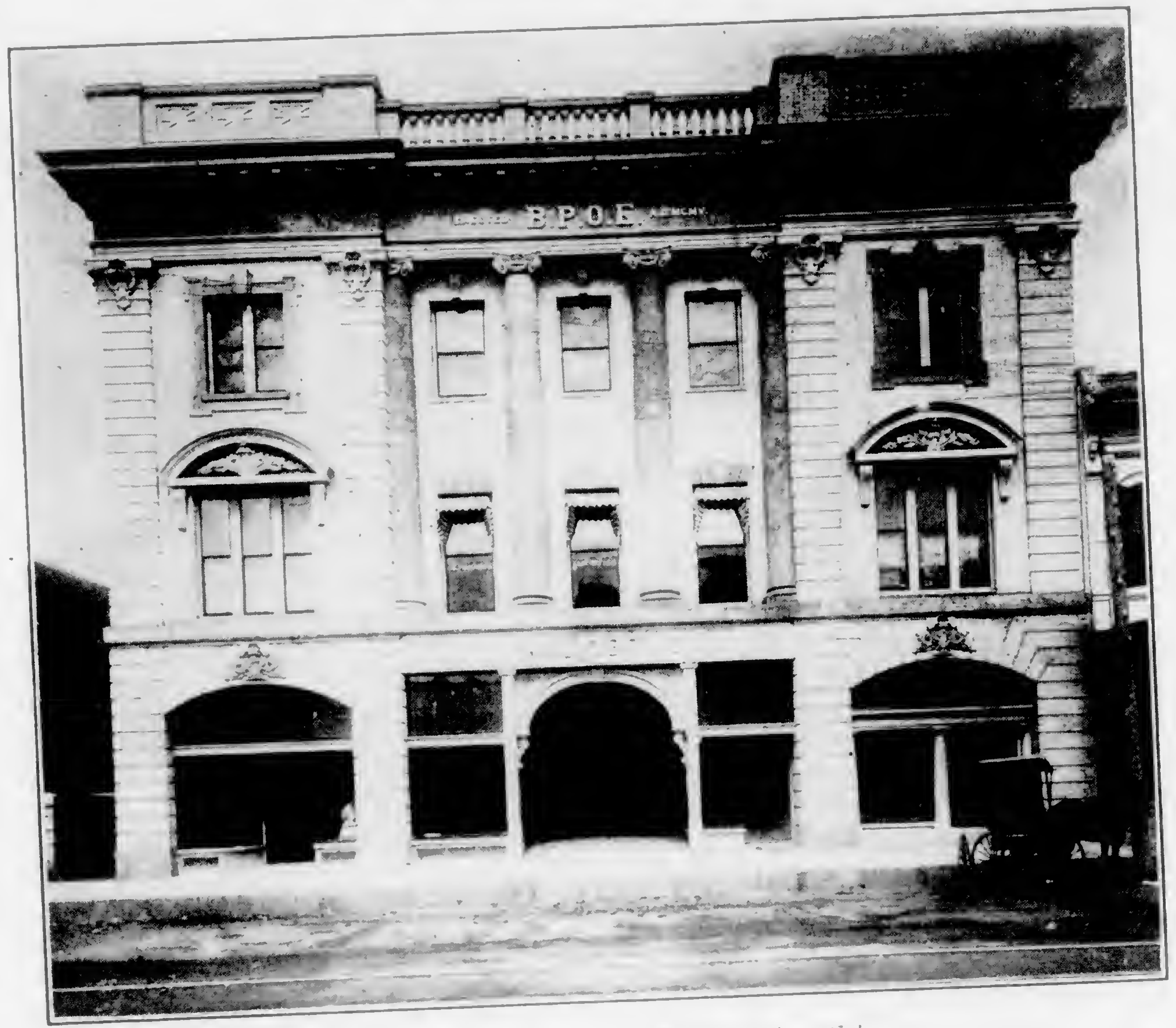
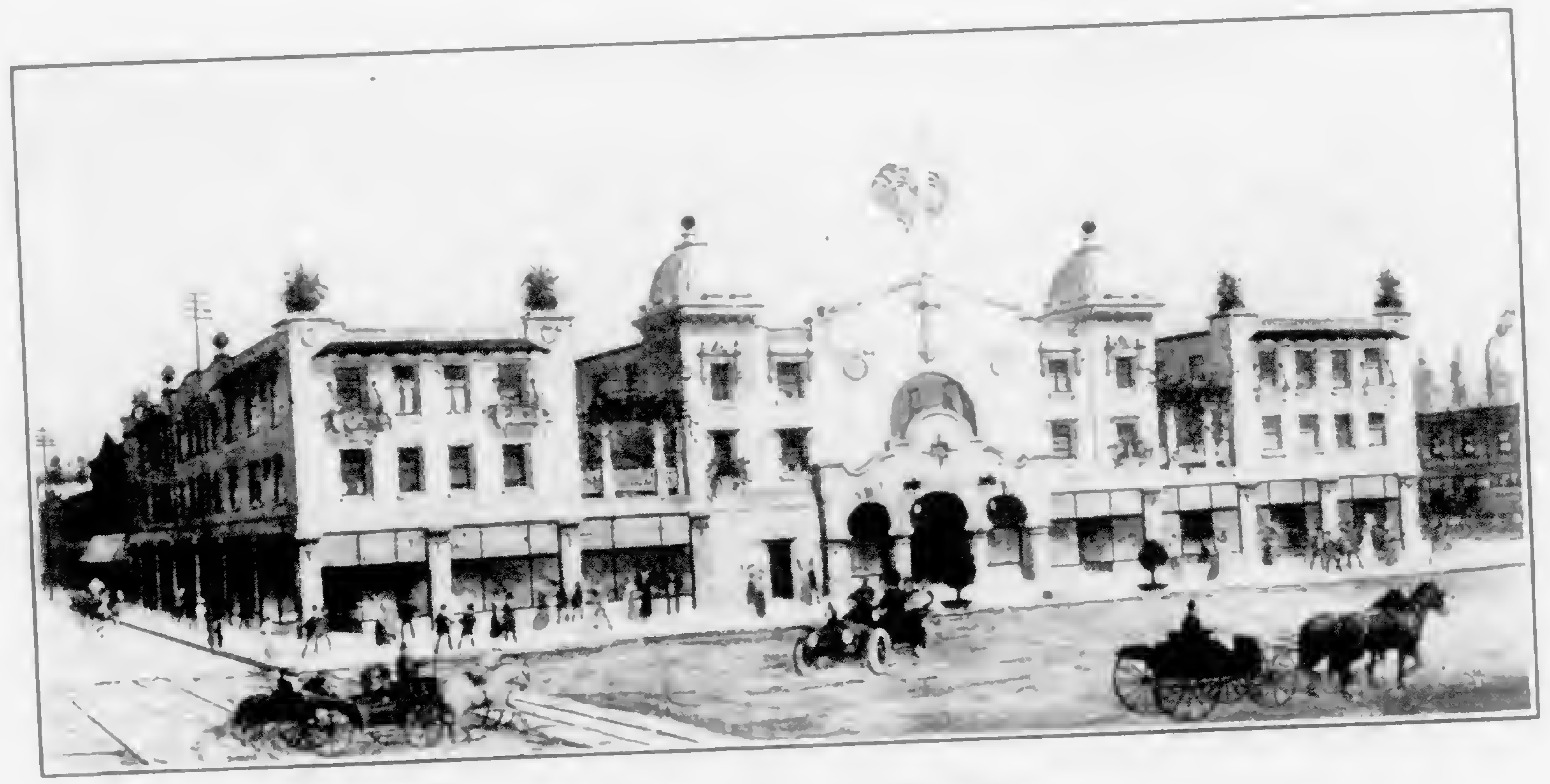


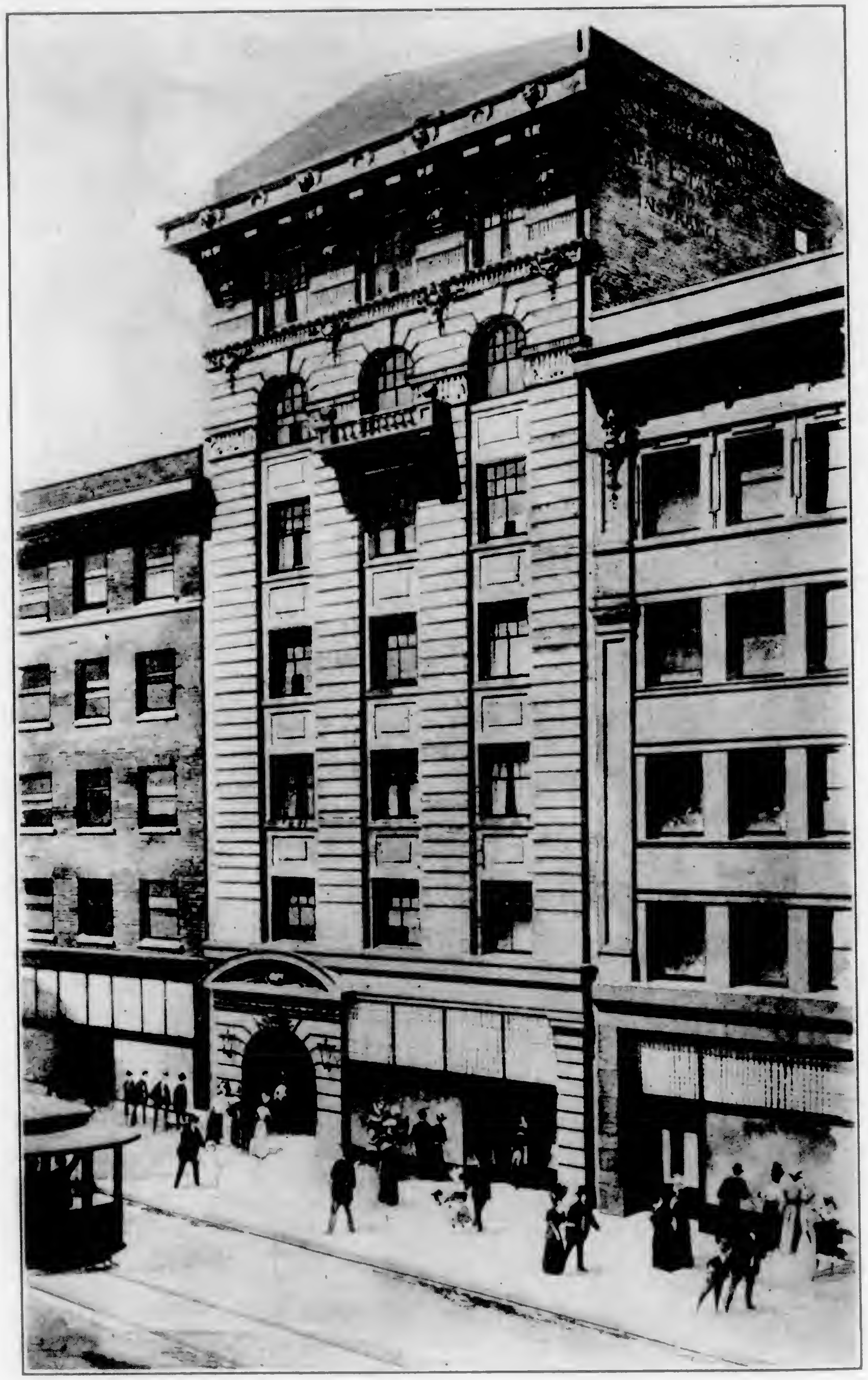
Hotel Exeter, Owned by Chas. S. Moses, San Francisco
Louis S. Stone and Henry C. Smith, Architects
Equipped with Otis Elevators



Elks' Hall and Theater Building, Chico, Cal.
Louis S. Stone and Henry C. Smith, Architects



Occidental Hotel, Santa Rosa
One Hundred Rooms on a Floor in this Reinforced Concrete Building
Louis S. Stone and Henry C. Smith, Architects



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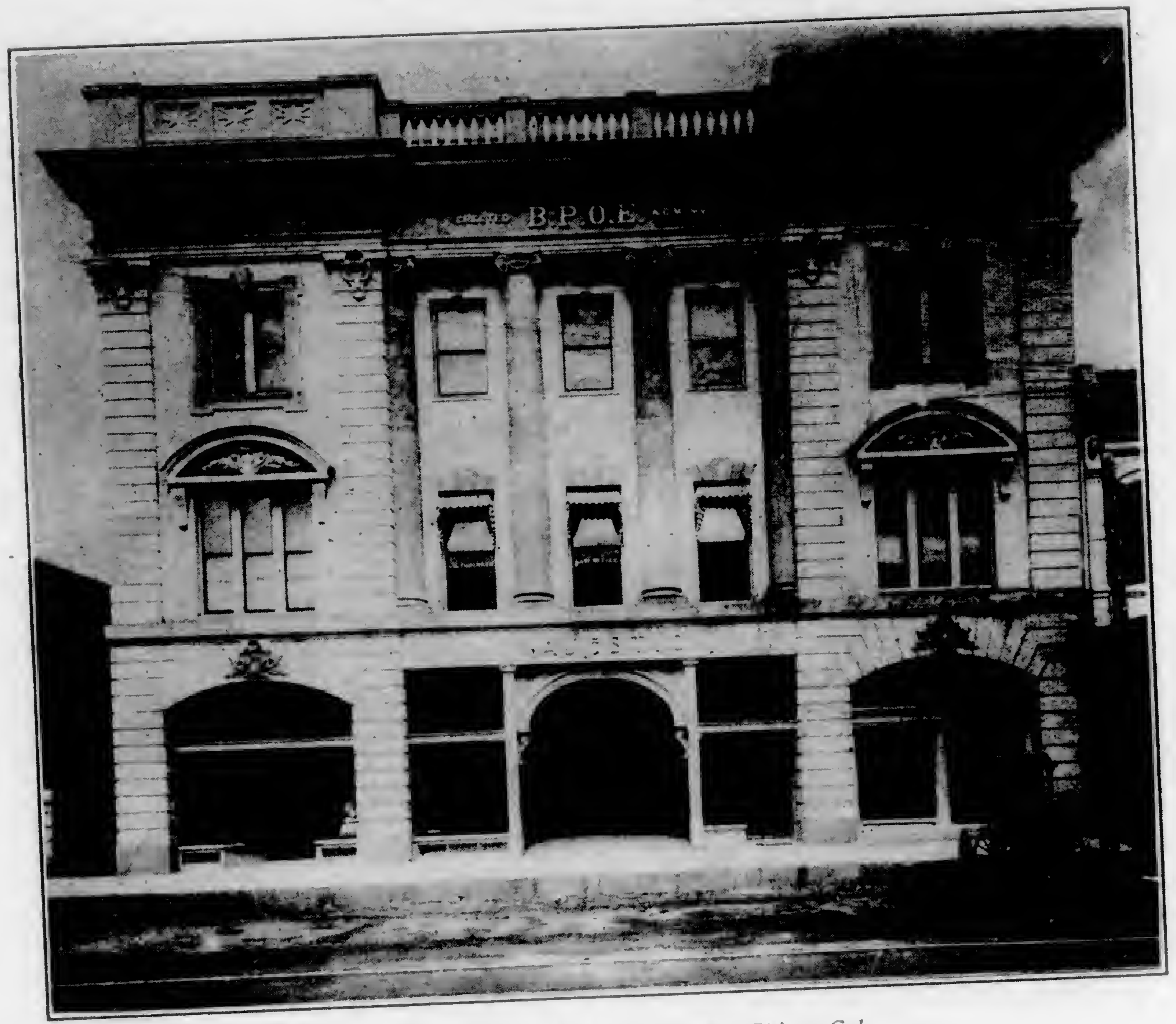

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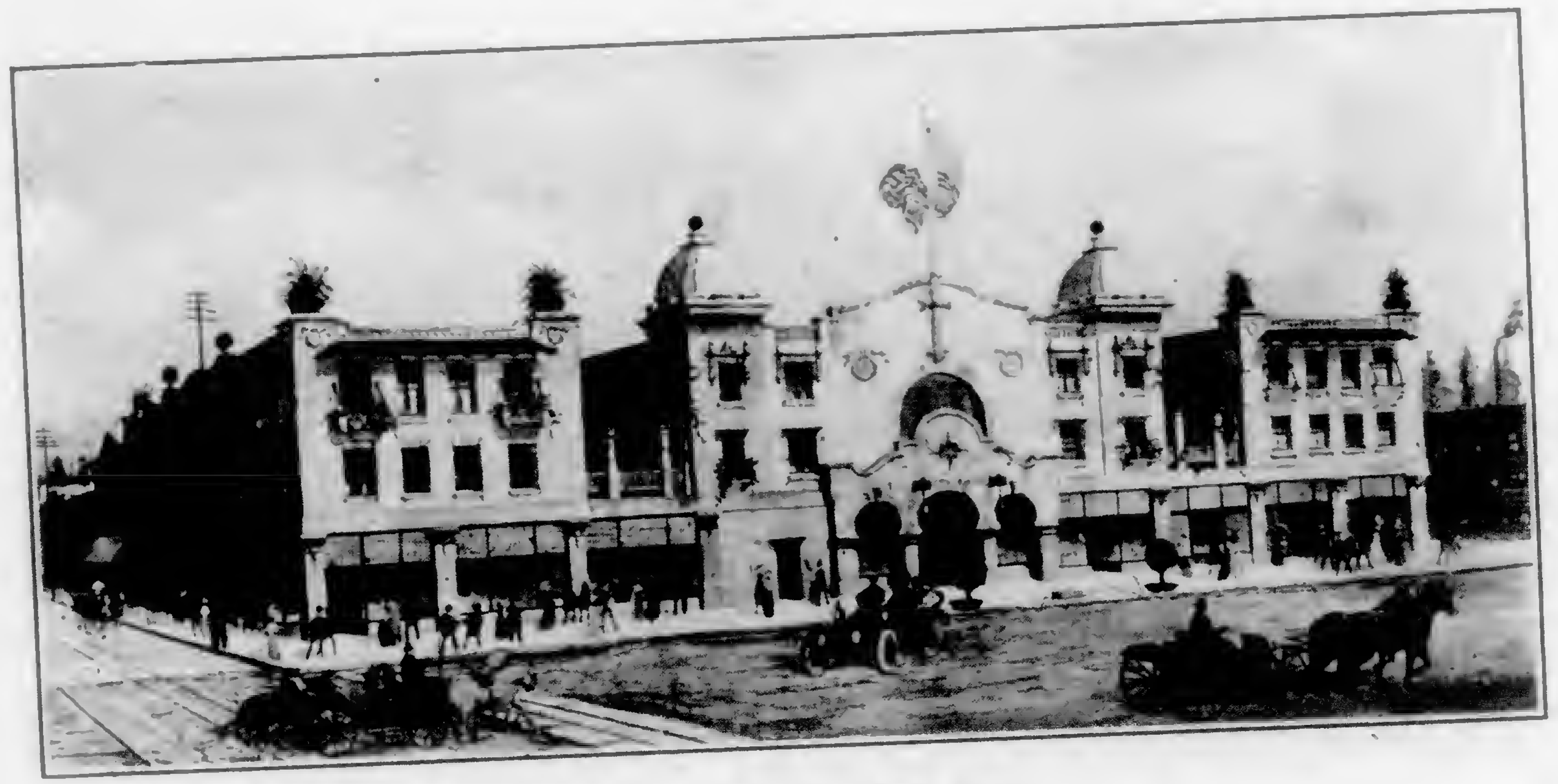

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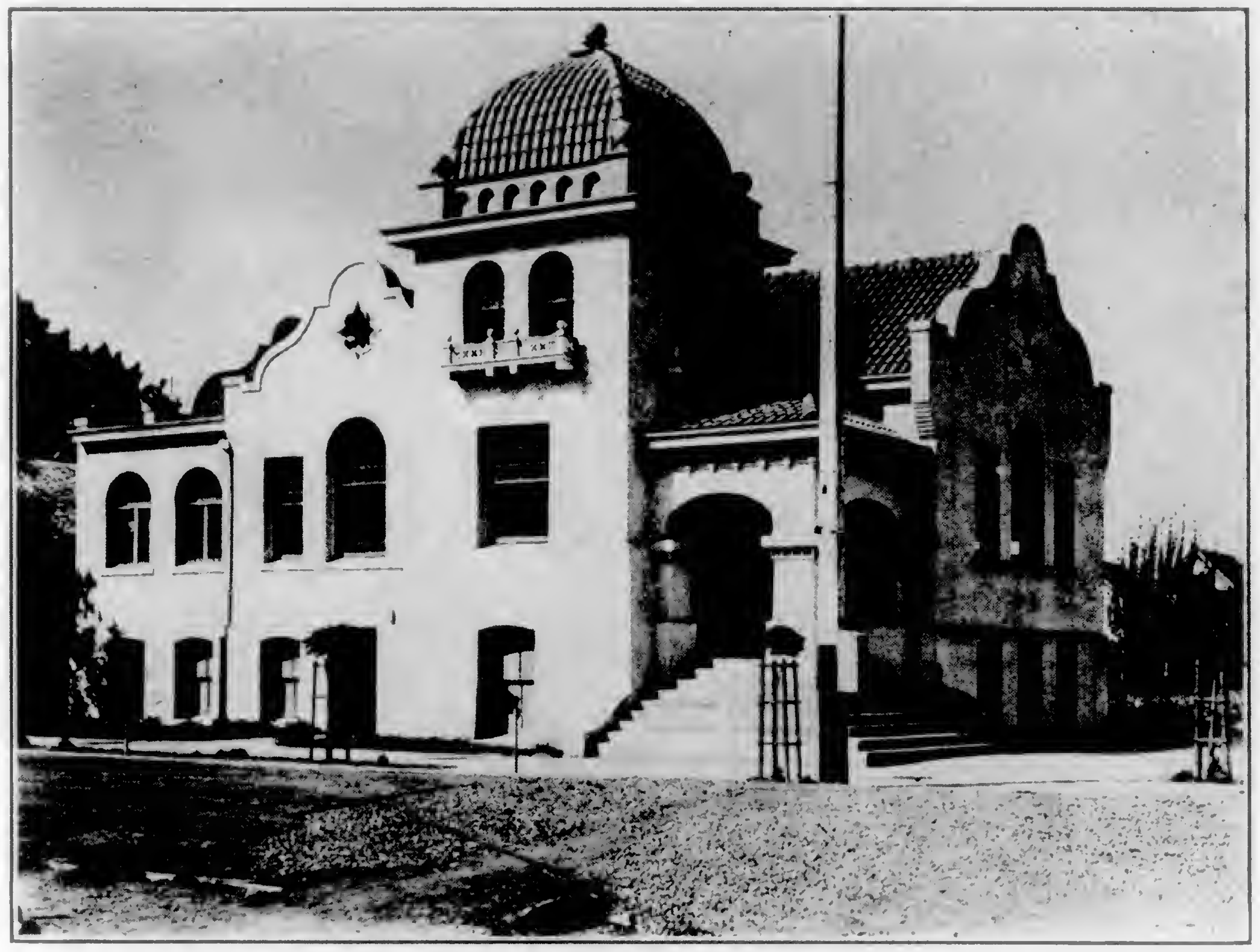

Carnegie Public Library, Haywards, Cal.
Louis S. Stone and Henry C. Smith, Architects

Carnegie Public Library, Colusa, Cal.
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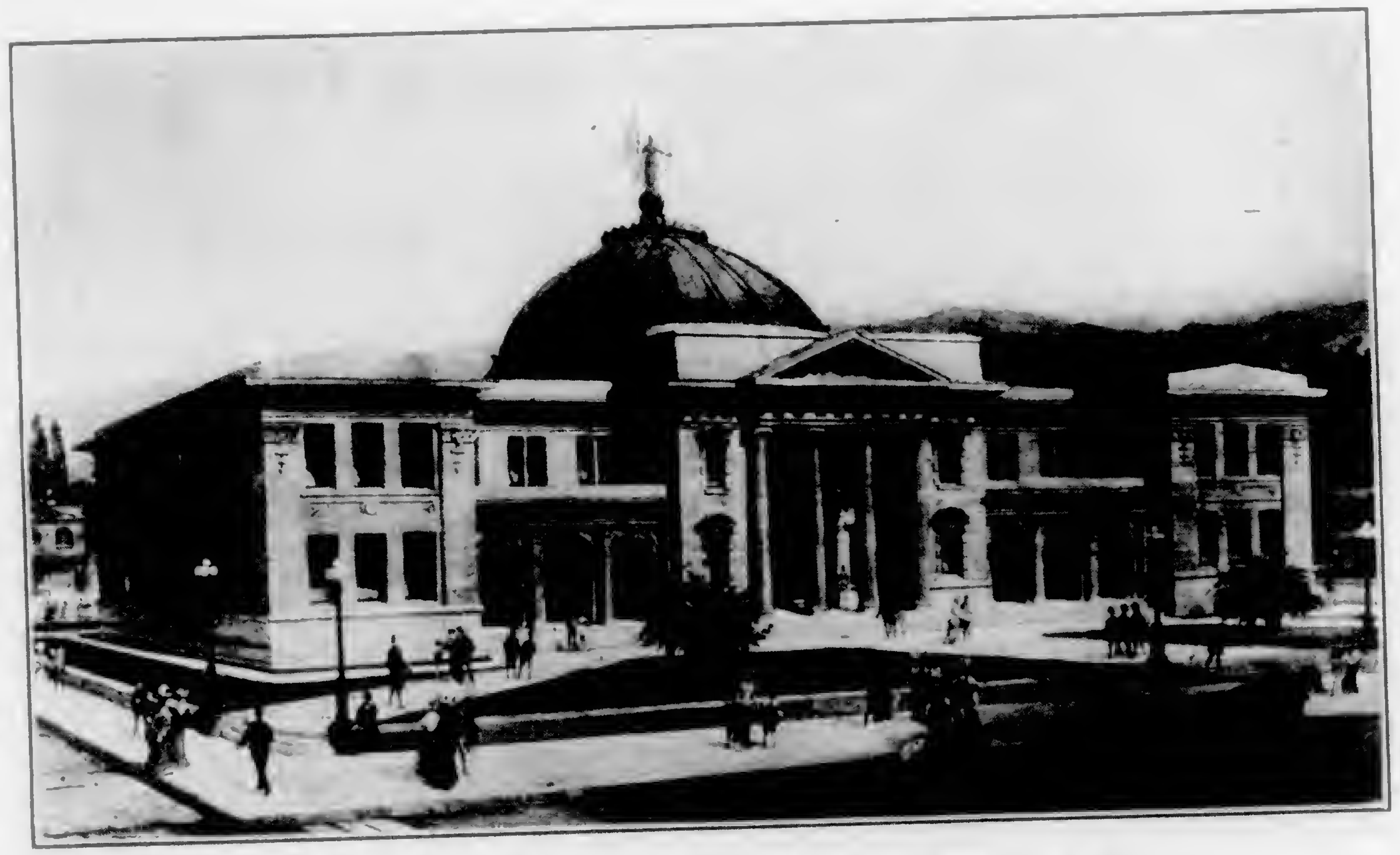
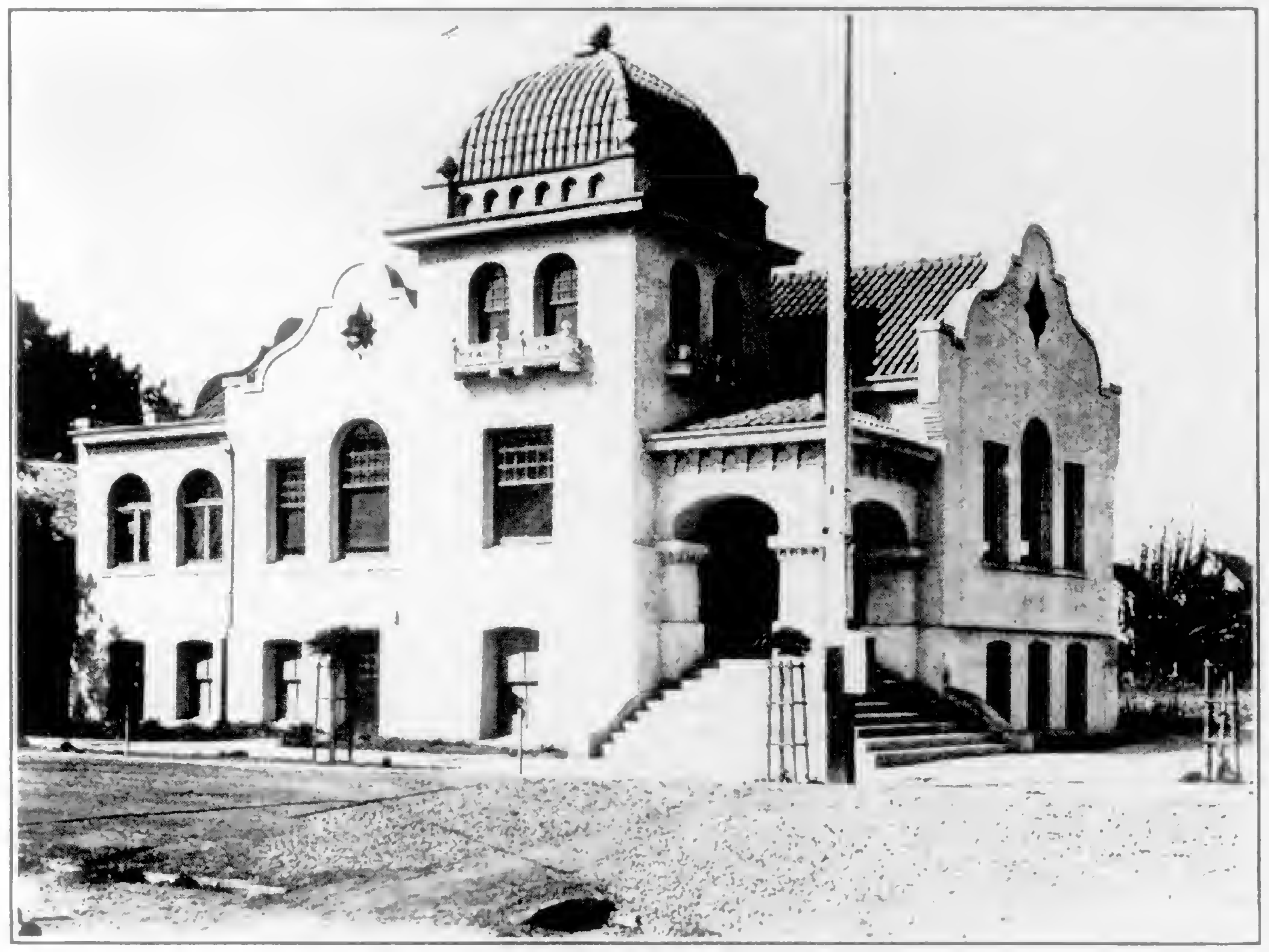
Colusa County Hall of Records, Colusa, Cal.
Louis S. Stone and Henry C. Smith, Architects



Competitive Design of Sonoma County Court House, Santa Rosa
Copper Dome Eighty Feet in Diameter
Louis S. Stone and Henry C. Smith, Architects



Carnegie Public Library, Haywards, Cal.
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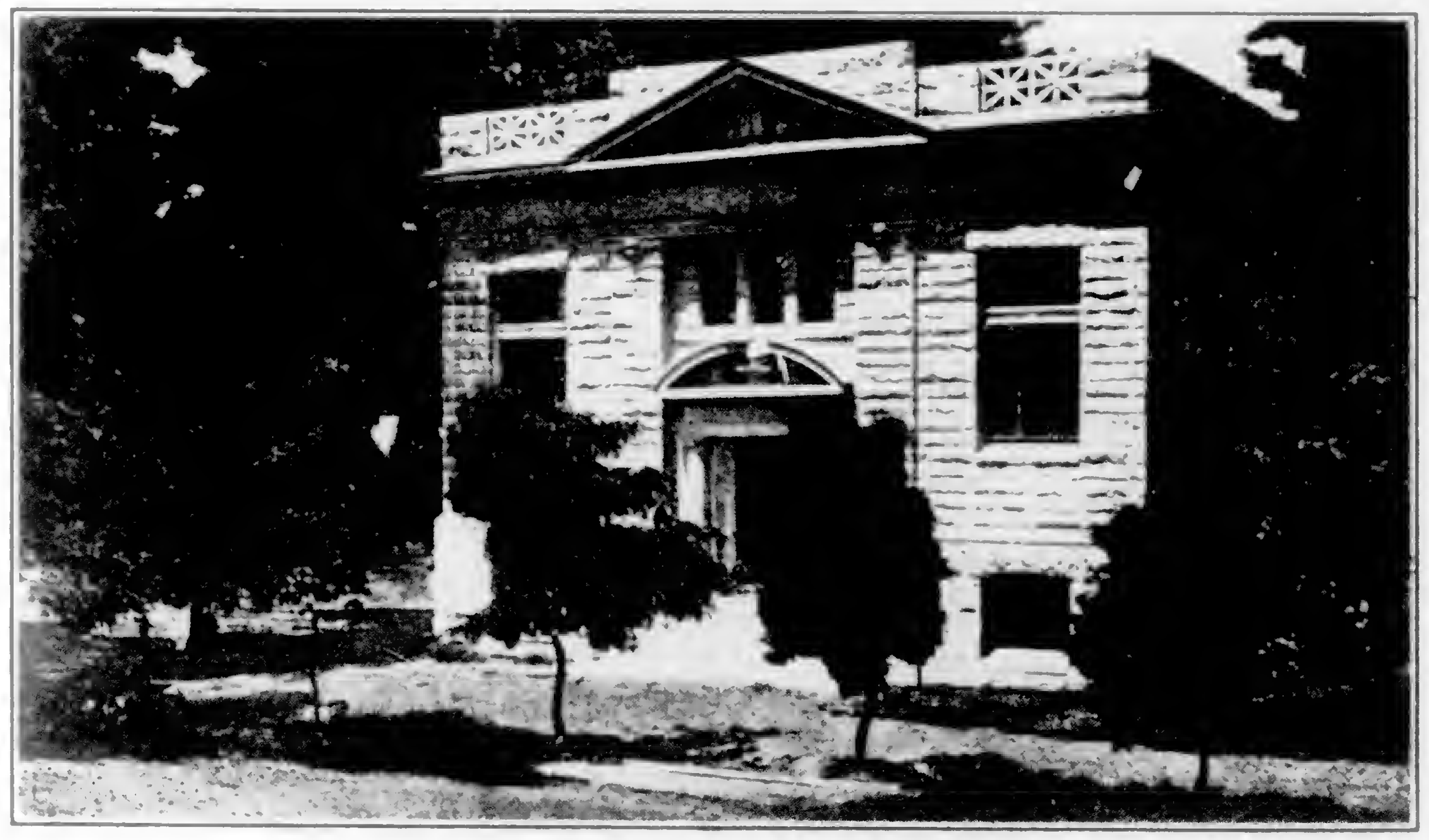

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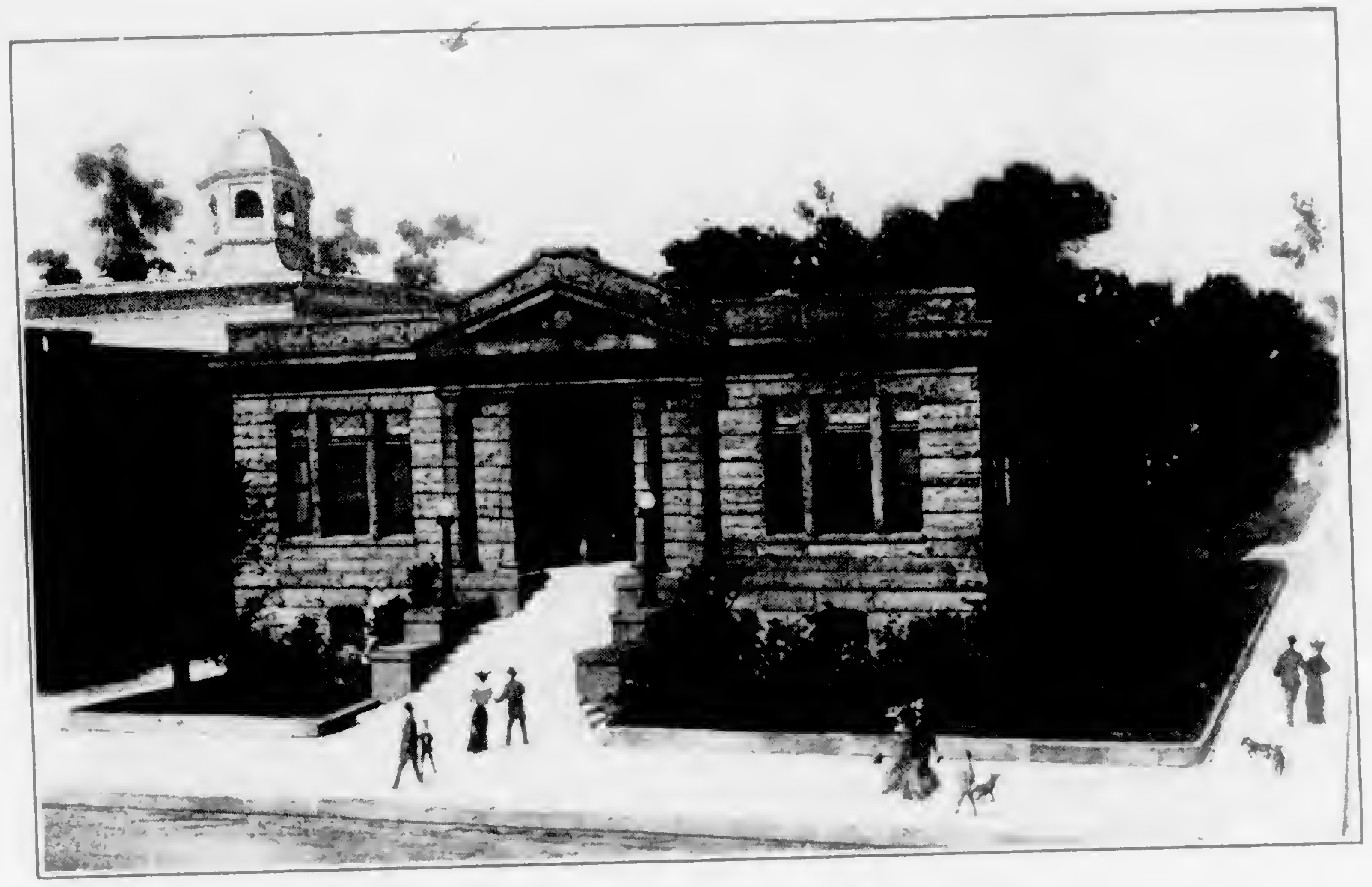

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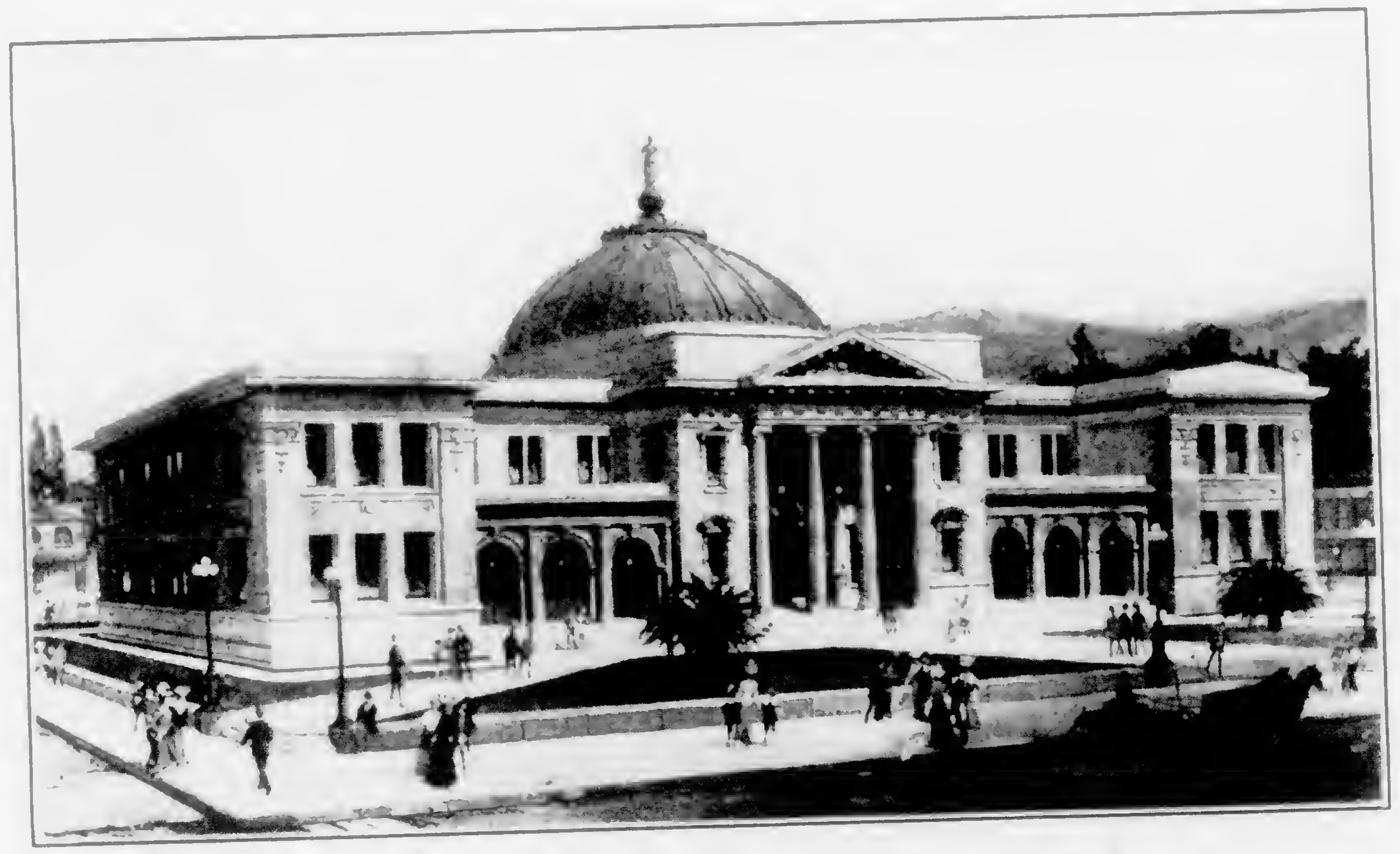

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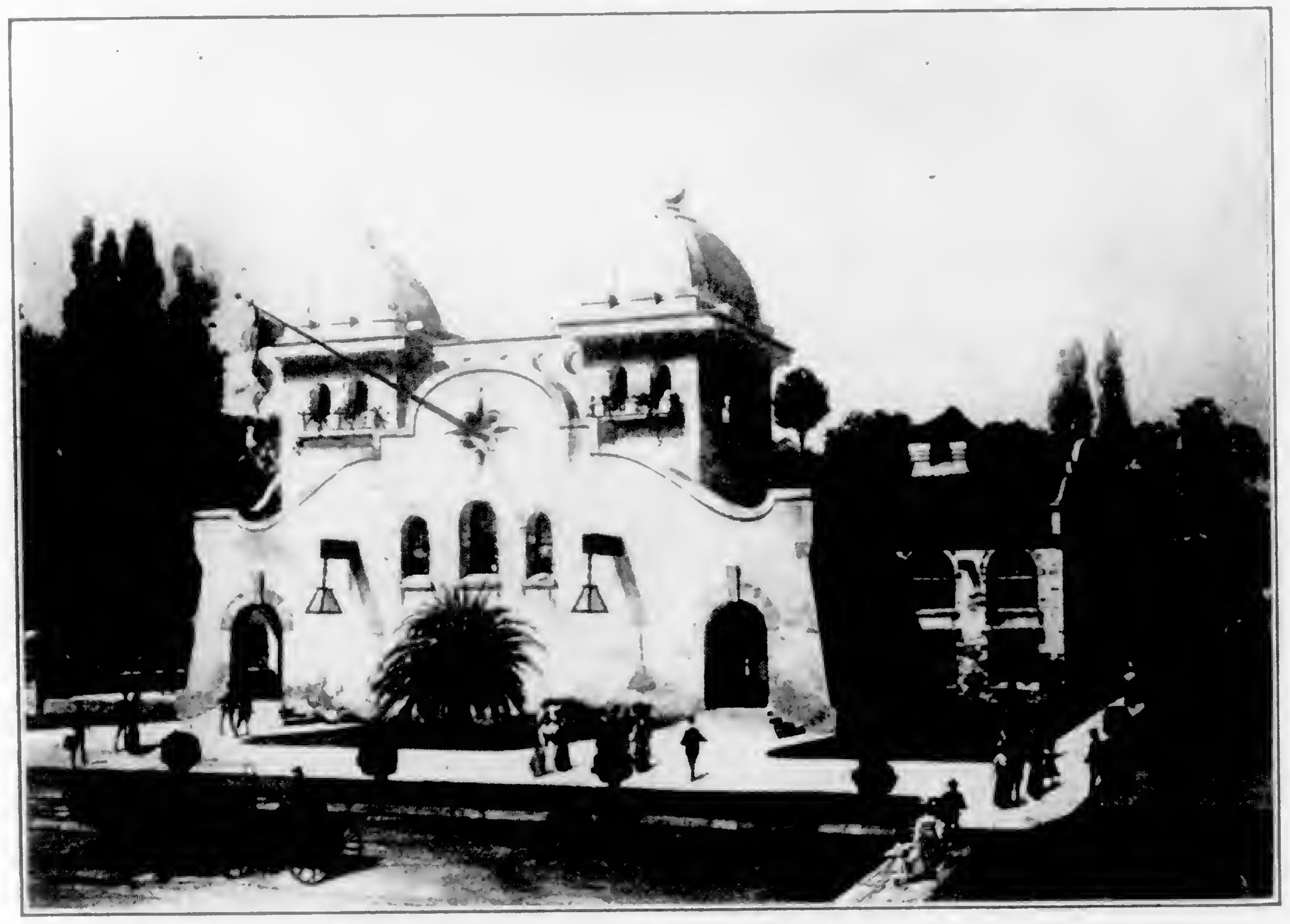
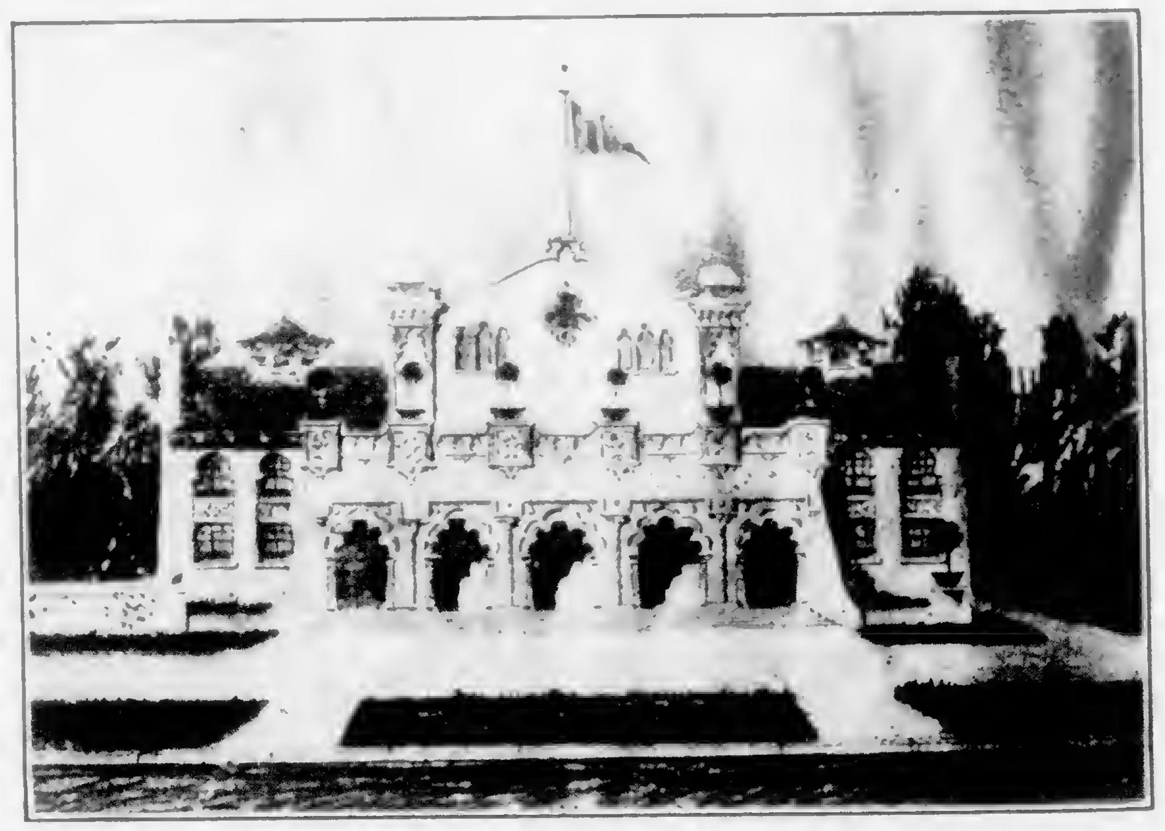
White House, Santa Rosa
Louis S. Stone
and
Henry C. Smith, Architects



Masonic Building, Old Mission



Scottish Rite Building
Louis S. Stone
and
Henry C. Smith, Architects

Modern School Architecture

By LOUIS S. STONE, Architect.

SPECIALIZATION in the designing of public school buildings has brought this class of architecture up to a high standard throughout the United States in recent years. As in any other line of business, the practice of architecture is capable of many subdivisions, and the architect who gives his time and best thought to designing one special class of buildings, will, invariably, accomplish the best results. To the amateur, planning a school building is comparatively easy, but the specialist, in spite of several years' devotion to the subject, finds he can learn something new in relation to the matter every day, and he has to keep alive on the subject in order to be in the lead. One reason for this fact is that school methods are continually changing, and as the plan of the building must conform to the requirements of the school work, the architect must keep in touch with school methods to develop a successful plan.

The author has seen many high school buildings planned on grammar school lines, regardless of the fact that the high school work differs very materially from that of the grammar school. Each room in a high school should be planned for its individual purpose, the size and position varying to suit that purpose. There are many special requirements for a high school which do not apply to grammar school buildings. The designer should familiarize himself with these needs before completing his plan, otherwise he will be eternally "blessed" by the faculty and school authorities.

California has advanced as rapidly as any state in the Union in the development of the modern public school building. It was but a few years ago when the badly arranged and poorly lighted and heated school building was the rule, now it is the exception. Mechanical ventilation was not even attempted. This fact is largely due to the active interest the heads of school departments have taken in cöoperating with architects in bringing about the best possible results. School superintendents and college professors have offered valuable assistance.

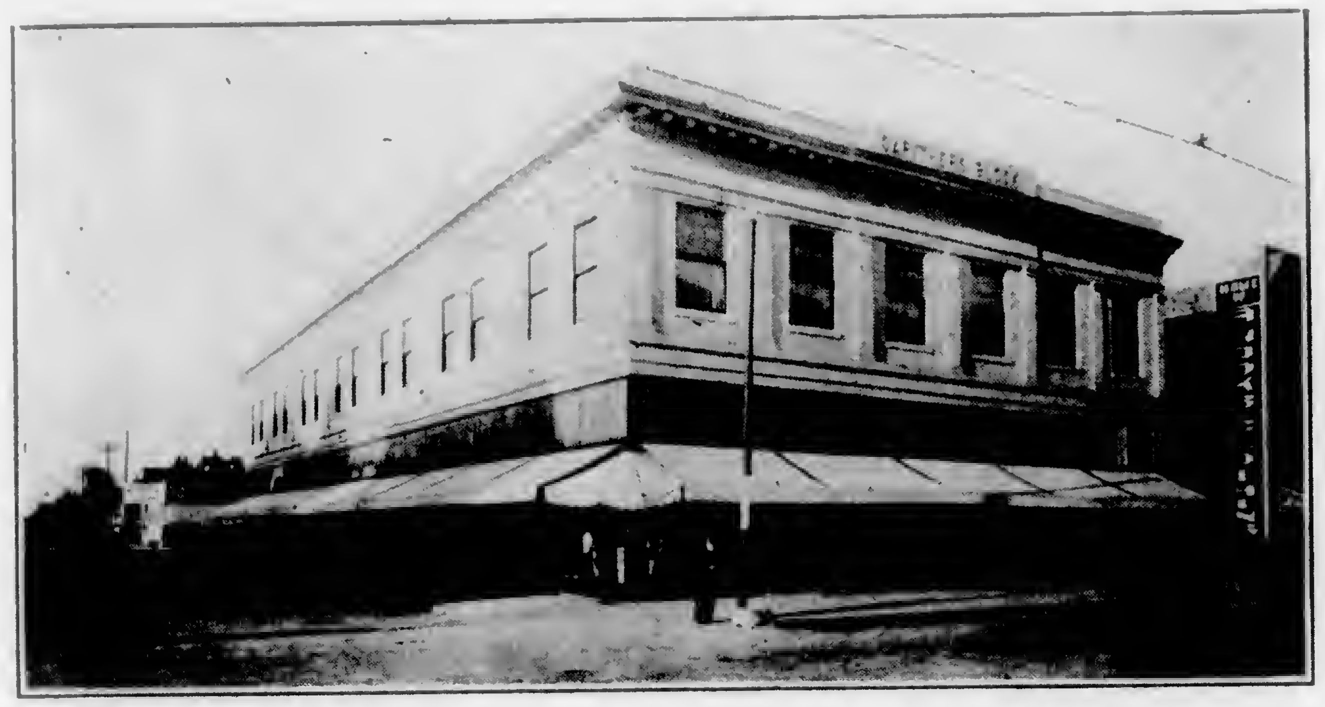
The most important improvement that has been made of late years is in the lighting of school rooms.

It is not an unusual sight to note a number of school children wearing glasses. The defective sight of these pupils the author attributes largely to cross lights and poor lighting of school rooms. No doubt a few years will show the good effects of the correctly lighted school room in diminishing this evil.

It is now an accepted fact that the school room should be lighted on the long side of the room to the left of the pupil, the windows being placed well above the floor, and as close to the ceiling as construction will permit. The mullions, or spaces between the windows, should be made as narrow as possible to reduce the shadow cast by them to the minimum. By using single I beam columns in place of the usual brick pier for mullions in brick buildings, practically no interruption is made to the admission of light, and an evenly diffused light is the result. The group of windows should be placed as near to the rear wall of the room as possible.

The proportion of the school room should be considered also, to obtain the best results with the one side lighting.

Next in importance come proper heating and ventilation. Rapid progress has been made in this line. Years ago, stoves which roasted the near pupils and let those on the outer edge suffer with cold were the rule.



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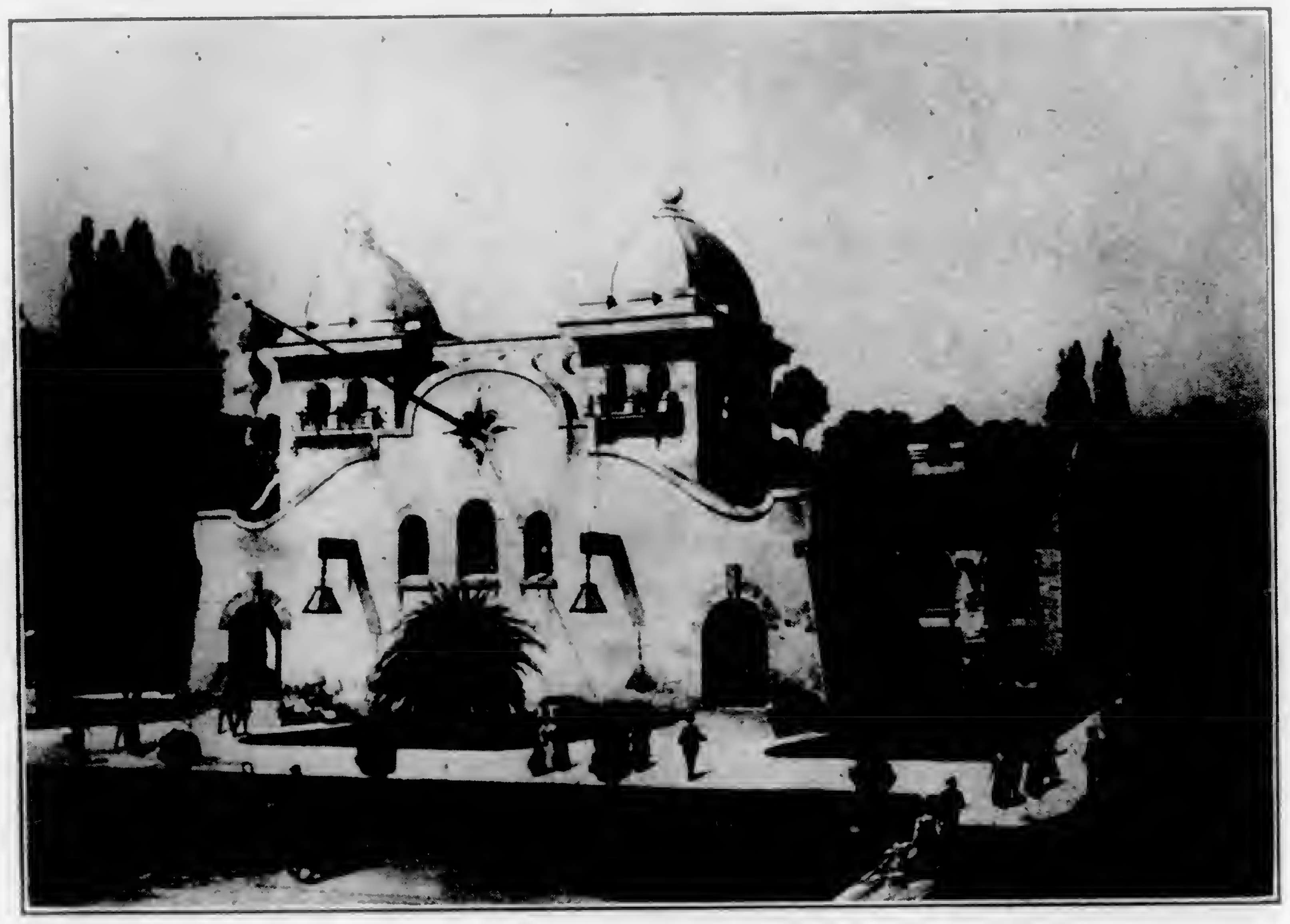

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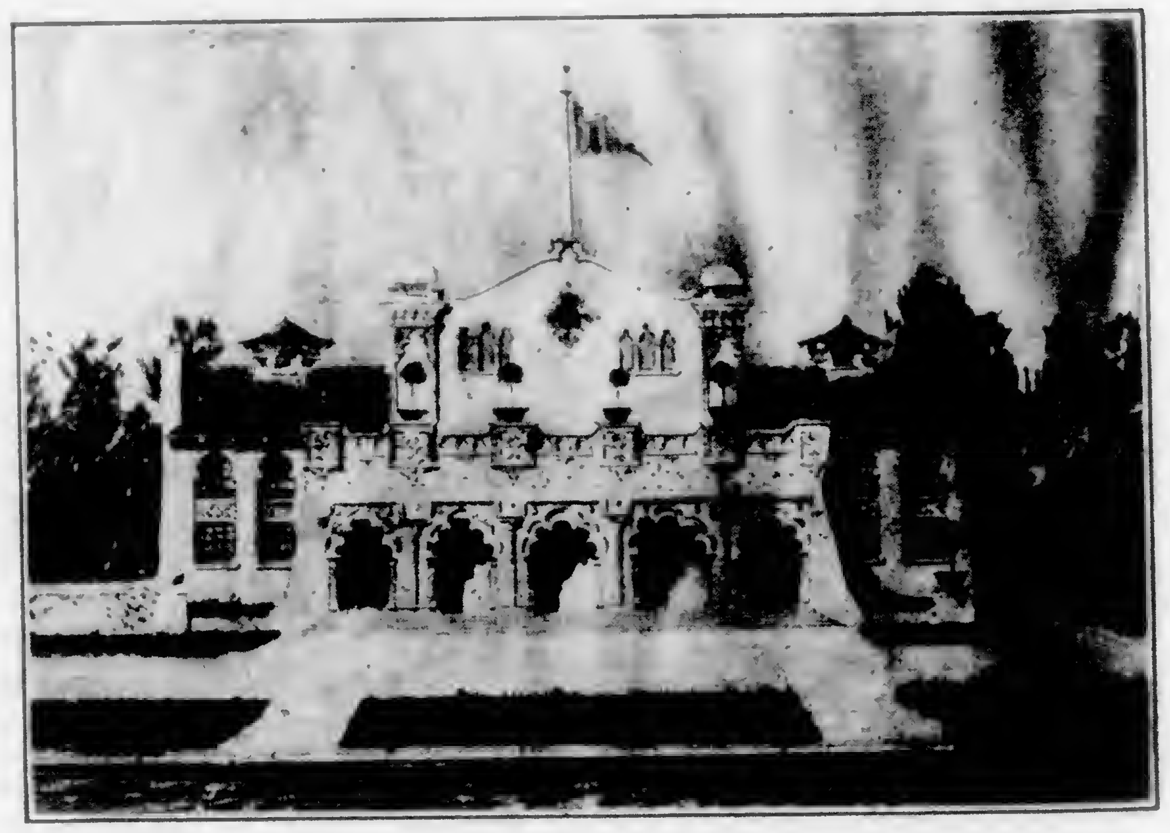

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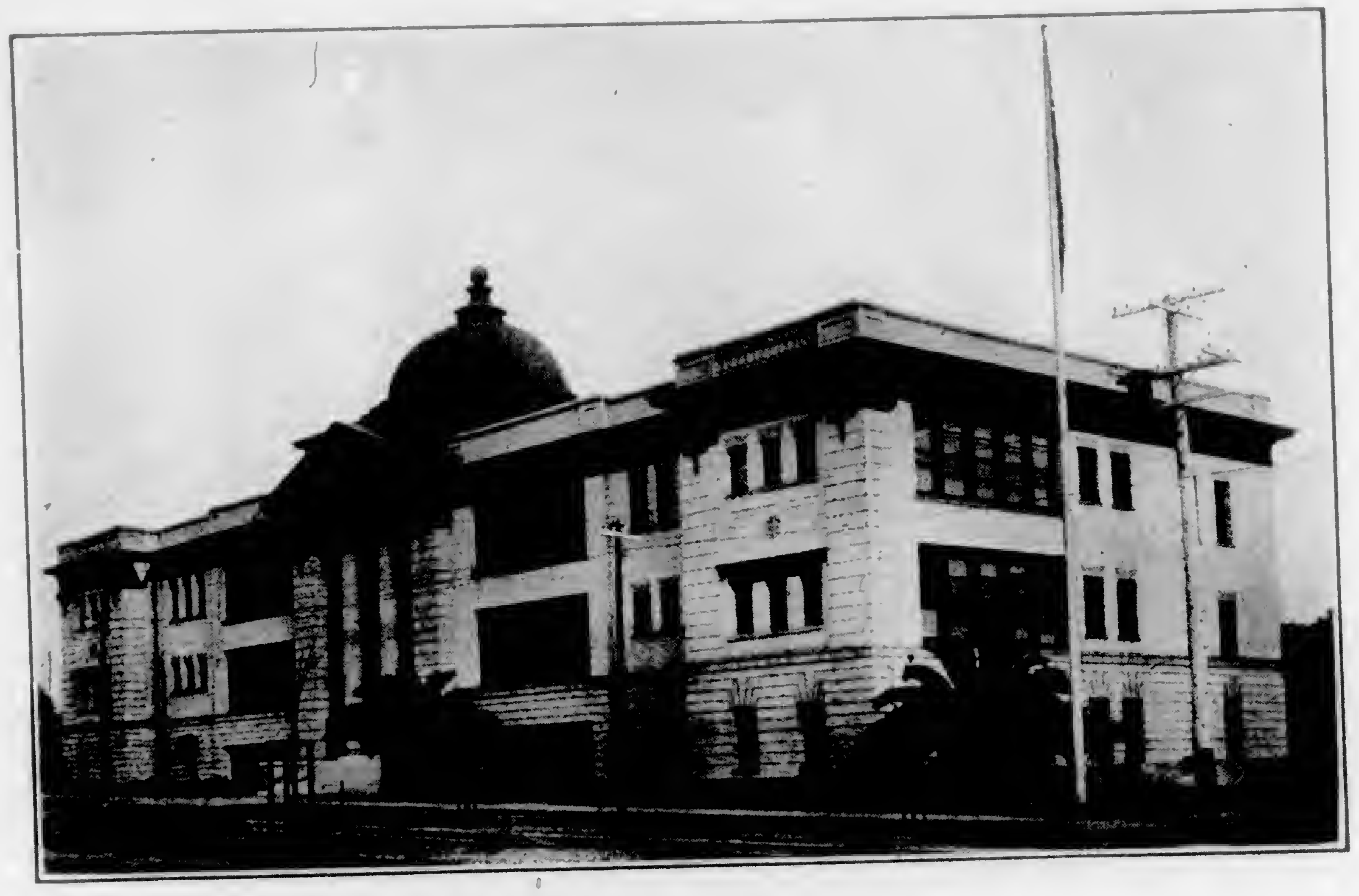
LOUIS S. STONE, Architect

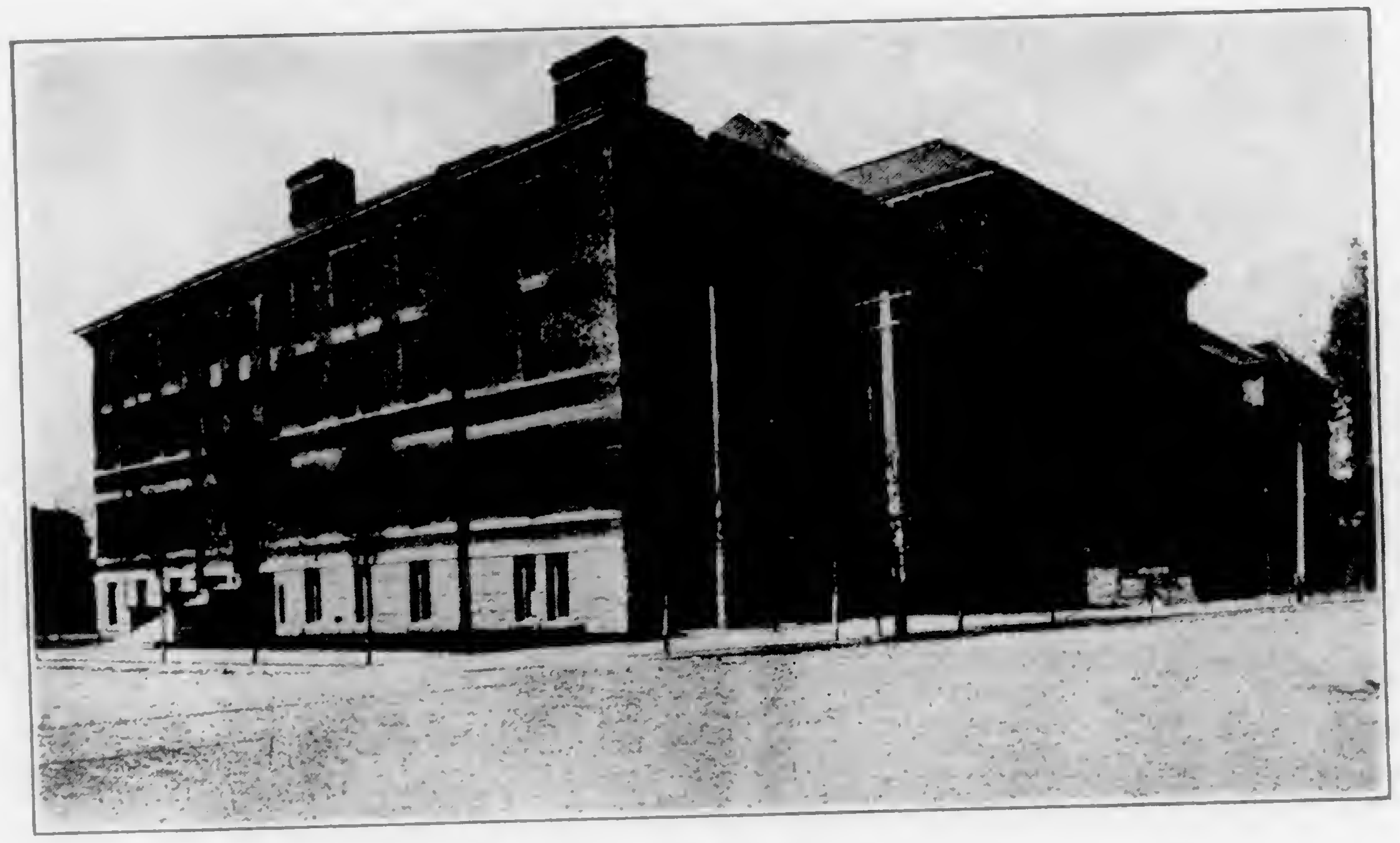
OF the many architects identified with the architectural progress of California, probably none has been so closely associated in the development of modern school architecture in this State as Mr. Louis S. Stone, senior member of the firm of Stone & Smith. Mr. Stone is a native son of California. He began the practice of his profession with Architect Wm. Curlett of San Francisco, twenty-five years ago, and after serving an apprenticeship went to England, where he spent two years in travel and study in the art shools of that country.

Returning to California, he entered Mr. Curlett's office and continued until he started in business for himself in 1887.

Early in his career, Mr. Stone formed the idea of specializing his work, and took up school architecture as his choice. The fact that he, in conjunction with his present partner, Mr. Henry C. Smith, has designed over 125 school buildings in California, indicates his success in this special class of architecture, while his versatility in other classes of architecture is amply shown by many examples of his work.



Grant School, Oakland, Cal.
Louis S. Stone and Henry C. Smith, Architects



Oakland High School, Oakland, Cal.
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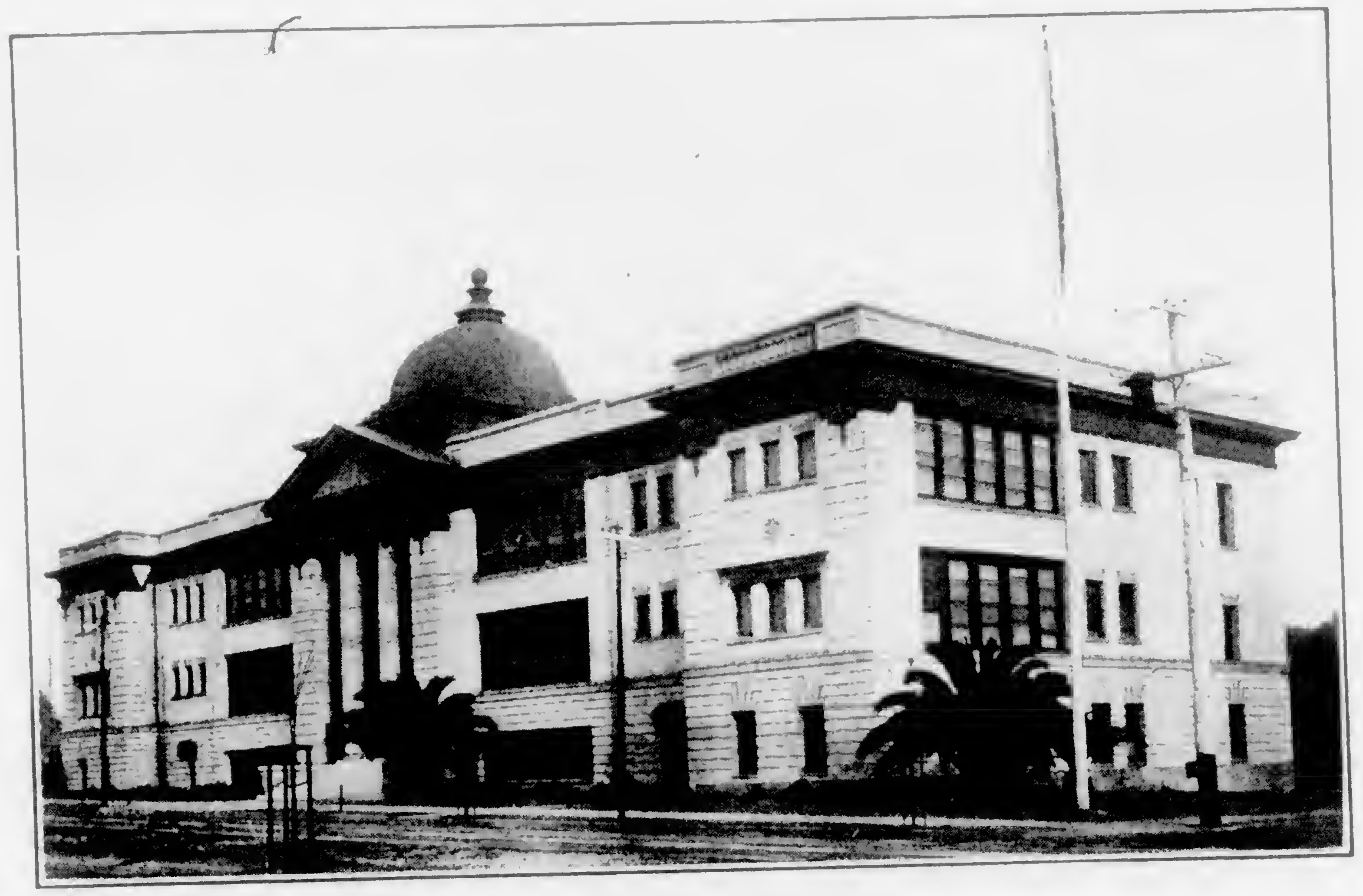

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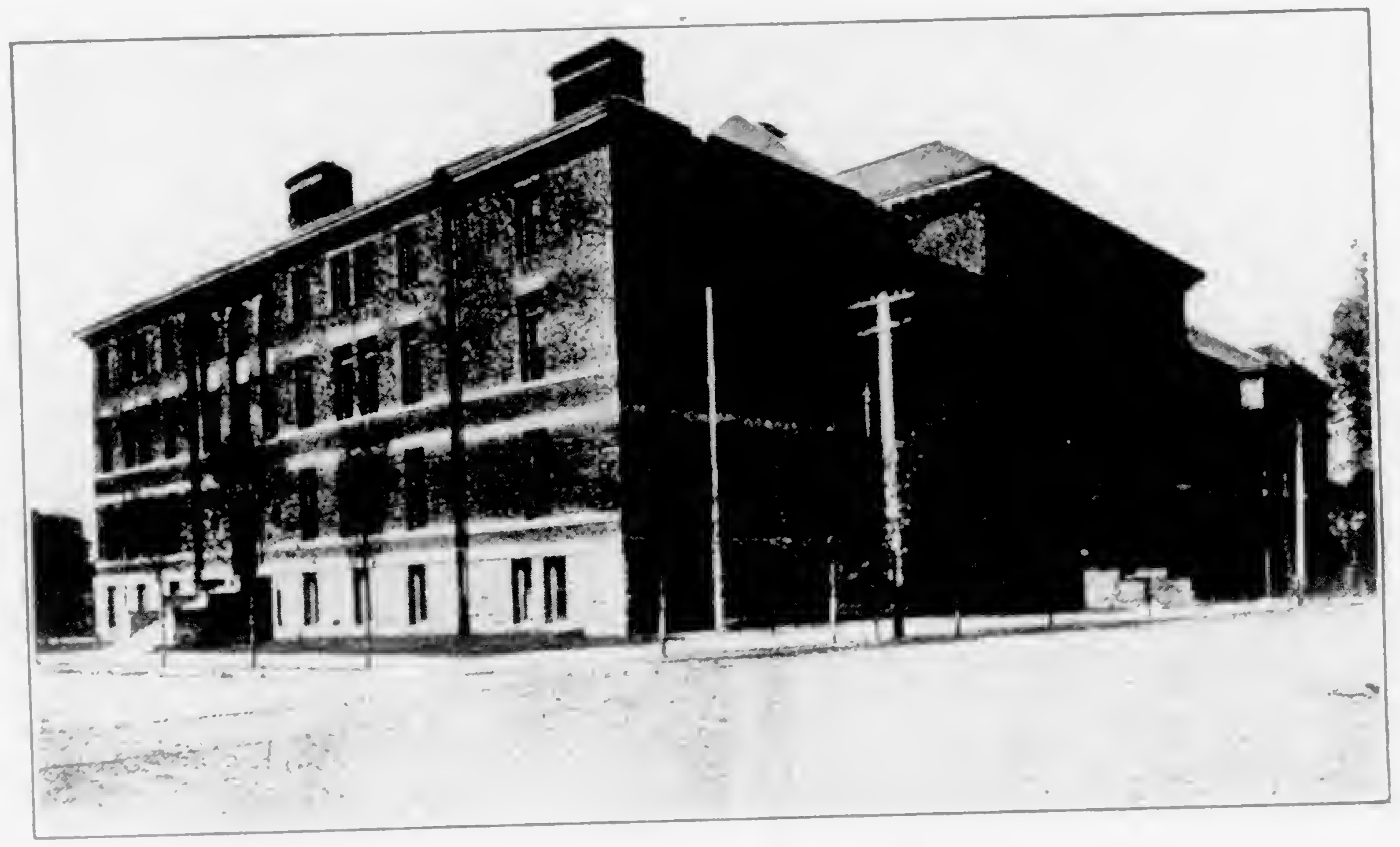


Oakland High School, Oakland, Cal.
Louis S. Stone and Henry C. Smith, Architects

Polytechnic High School, Berkeley, Cal.
Louis S. Stone and Henry C. Smith, Architects

Then cheap pot furnaces that burned the air to such an extent that it was not fit to breathe, were put in school buildings. Now no intelligent school board thinks its new school building complete and up-to-date without a plenum system of heating and ventilating, insuring a continual supply of moderately heated fresh air evenly distributed throughout the room, being completely replenished about every six minutes. The temperature of the air in this kind of a system should be automatically controlled, making it unnecessary for the teacher to give any of her time or thought to keeping the room at a certain temperature.

A modern system of heating and ventilating means that the architect must be familiar with the requirements of the same, and plan the proper spaces for fresh air and vent ducts and the proper inlet of the fresh air supply to the fresh air room. Good results cannot be attained by crowding a plenum system into small, inadequate spaces. It is better to have a large inlet for the fresh air propelled by means of a mechanical blower at a low speed, than small flues admitting the air at high speed, for the reason that it is more economical to operate at the low speed and prevents any tendency to draughts. The system also will last longer.

The modern system of heating and ventilating also permits of lower ceilings than formerly, and is economical in the use of time on the part of the janitor, as the whole heating and ventilating apparatus is at one central point method instead of being scattered all over the building.

These matters have a direct bearing on the health and minds of the school children, so that in correcting the effects of bad lighting and poor heating and ventilating, not only the health, but the work of the child is improved. The design of the school building, the laying out of the grounds and color schemes of the interior are all quite important. The aim of the modern school architect in designing his building is towards a pure architectural treatment of the exterior, making the interior needs dominate the design. This is eminently proper, as the fundamental basis of school planning should be first along practical lines, fitting each room to its proper purpose.

The selection of the site has an important relation to the design. Many a good design has been ruined for want of a proper setting. Architects should use their best efforts to induce school boards to provide sites capable of liberal play grounds and a certain amount of landscape gardening.

The southern part of the state has been much more liberal in this respect, because the people seem to appreciate better than we of the north, the value of a proper setting for a building.

While a school building is first and foremost a work shop, there is no reason why a certain proportion of effort and money should not be expended towards proper design and ornament, but this does not mean grouping windows and proportioning the building for purely architectural effect, regardless of correct interior arrangement. The pupil graduating from a modern high school building should have the impression on his mind of correct architectural proportions and ornament, gained from familiarity with the details of the building from which he was graduated.

It is rarely that a school district is generous enough to permit the architect to dress his building up as well as his knowledge and taste would prompt, but districts are getting more and more liberal in this respect, so there is hope that in the near future the ambitious and capable architect may have full swing in this respect.

School boards are primarily to blame for the meagerness and poor construction of some buildings, as they invariably make a rough guess

Polytechnic High School, Berkeley, Cal.
Louis S. Stone and Henry C. Smith, Architects

Then cheap pot furnaces that burned the air to such an extent that it was not fit to breathe, were put in school buildings. Now no intelligent school board thinks its new school building complete and up-to-date without a plenum system of heating and ventilating, insuring a continual supply of moderately heated fresh air evenly distributed throughout the room, being completely replenished about every six minutes. The temperature of the air in this kind of a system should be automatically controlled, making it unnecessary for the teacher to give any of her time or thought to keeping the room at a certain temperature.

A modern system of heating and ventilating means that the architect must be familiar with the requirements of the same, and plan the proper spaces for fresh air and vent ducts and the proper inlet of the fresh air supply to the fresh air room. Good results cannot be attained by crowding a plenum system into small, inadequate spaces. It is better to have a large inlet for the fresh air propelled by means of a mechanical blower at a low speed, than small flues admitting the air at high speed, for the reason that it is more economical to operate at the low speed and prevents any tendency to draughts. The system also will last longer.

The modern system of heating and ventilating also permits of lower ceilings than formerly, and is economical in the use of time on the part of the janitor, as the whole heating and ventilating apparatus is at one central point method instead of being scattered all over the building.

These matters have a direct bearing on the health and minds of the school children, so that in correcting the effects of bad lighting and poor heating and ventilating, not only the health, but the work of the child is improved. The design of the school building, the laying out of the grounds and color schemes of the interior are all quite important. The aim of the modern school architect in designing his building is towards a pure architectural treatment of the exterior, making the interior needs dominate the design. This is eminently proper, as the fundamental basis of school planning should be first along practical lines, fitting each room to its proper purpose.

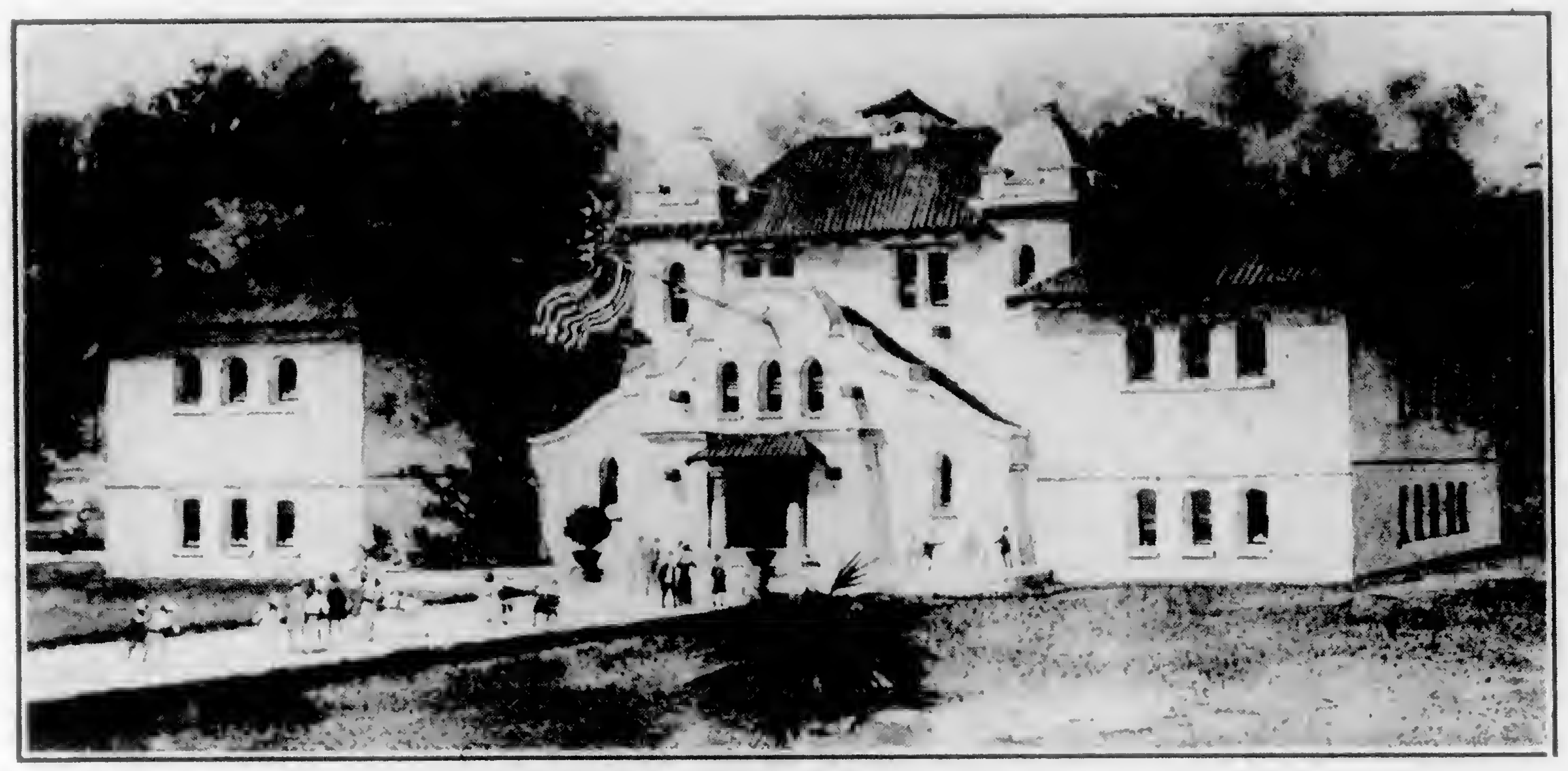
The selection of the site has an important relation to the design. Many a good design has been ruined for want of a proper setting. Architects should use their best efforts to induce school boards to provide sites capable of liberal play grounds and a certain amount of landscape gardening.

The southern part of the state has been much more liberal in this respect, because the people seem to appreciate better than we of the north, the value of a proper setting for a building.

While a school building is first and foremost a work shop, there is no reason why a certain proportion of effort and money should not be expended towards proper design and ornament, but this does not mean grouping windows and proportioning the building for purely architectural effect, regardless of correct interior arrangement. The pupil graduating from a modern high school building should have the impression on his mind of correct architectural proportions and ornament, gained from familiarity with the details of the building from which he was graduated.

It is rarely that a school district is generous enough to permit the architect to dress his building up as well as his knowledge and taste would prompt, but districts are getting more and more liberal in this respect, so there is hope that in the near future the ambitious and capable architect may have full swing in this respect.

School boards are primarily to blame for the meagerness and poor construction of some buildings, as they invariably make a rough guess



Los Gatos High School, Los Gatos, Cal.
Louis S. Stone and Henry C. Smith, Architects

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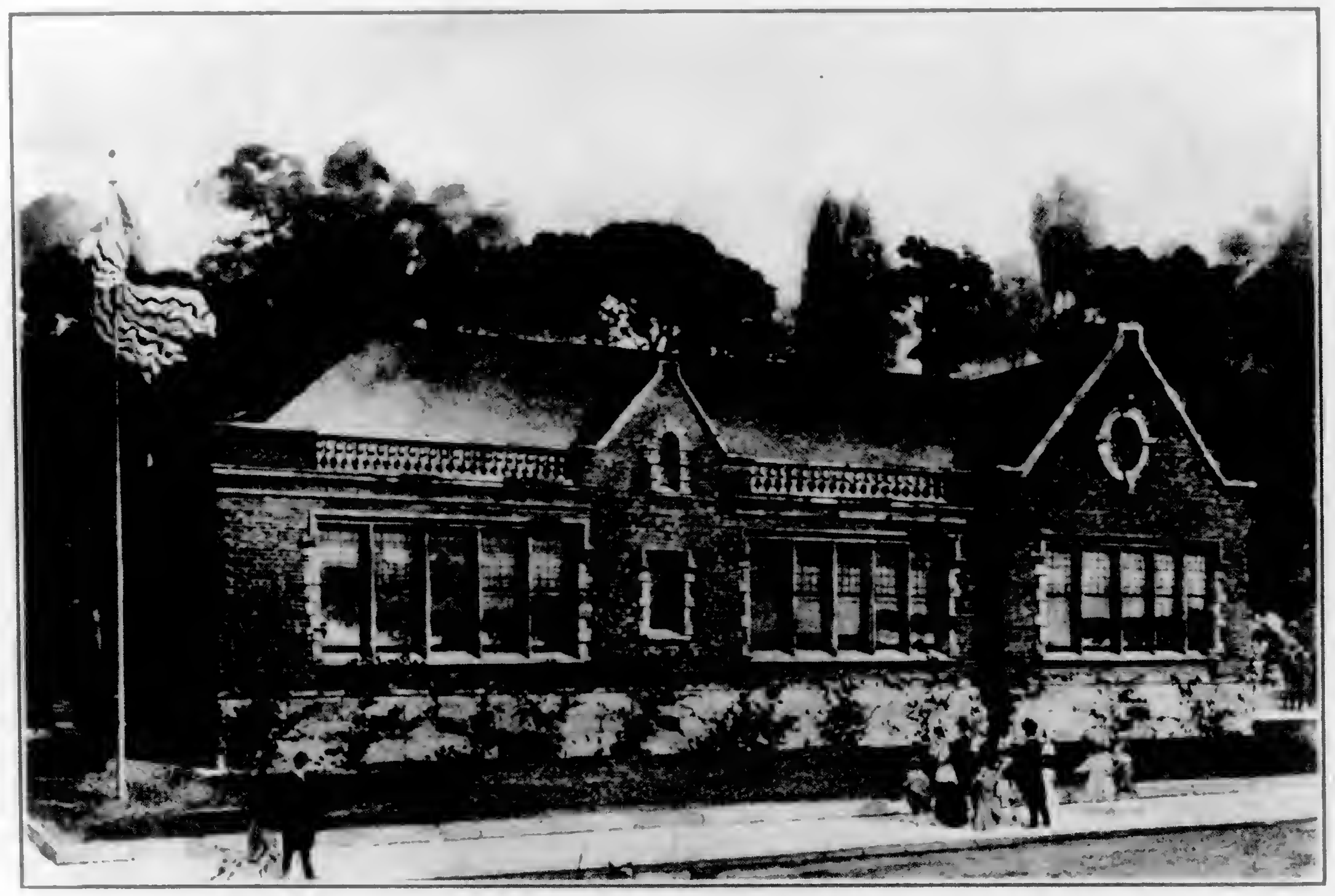
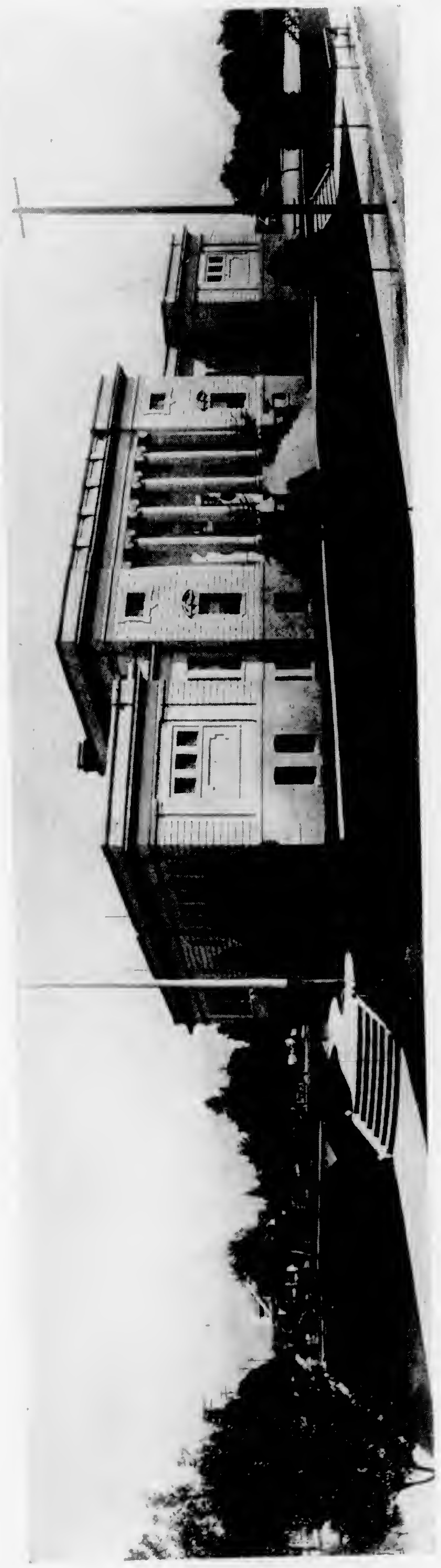


Modesto Grammar School
Louis S. Stone and Henry C. Smith, Architects



Pomona High School, Pomona, Cal.
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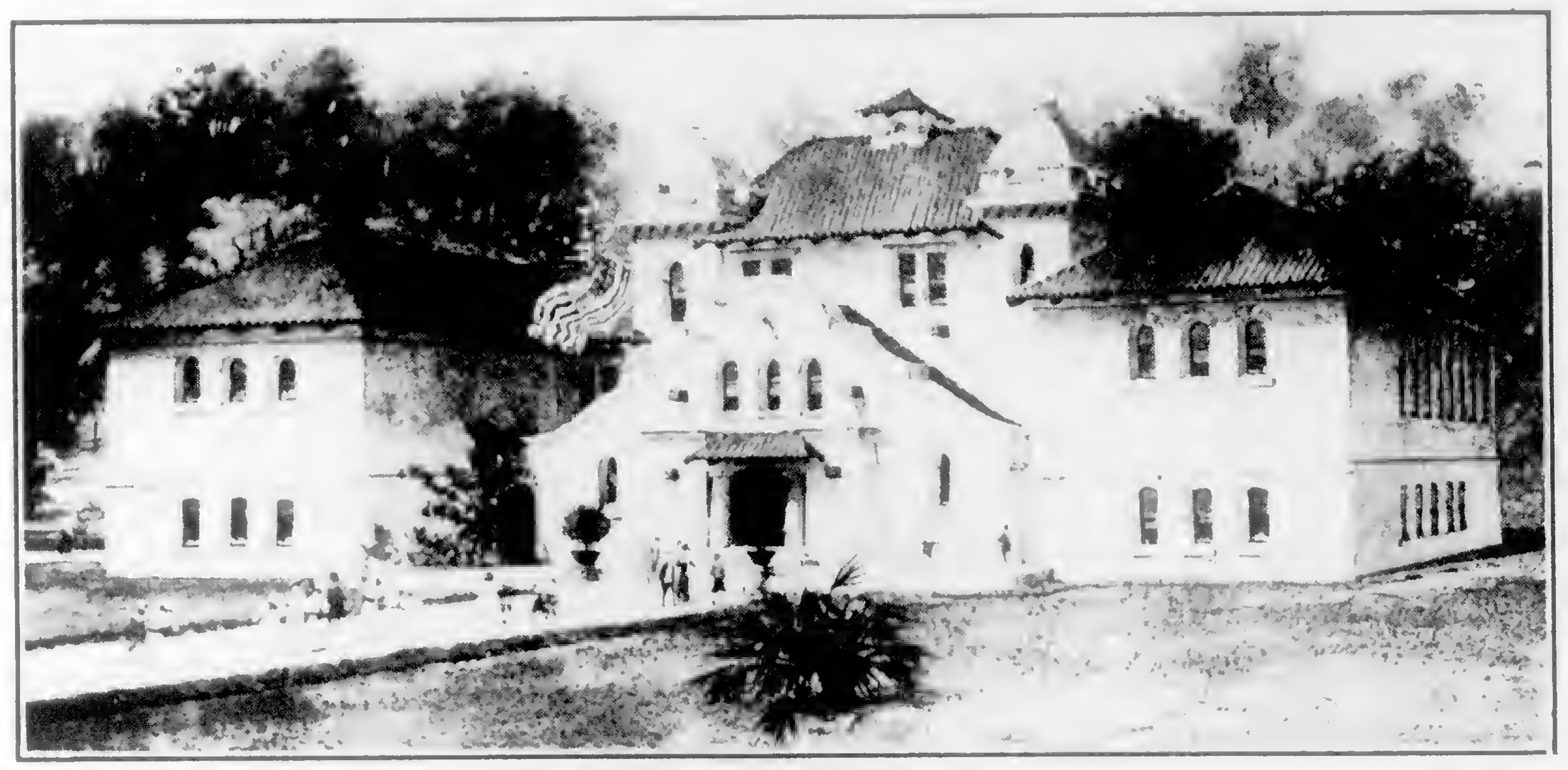

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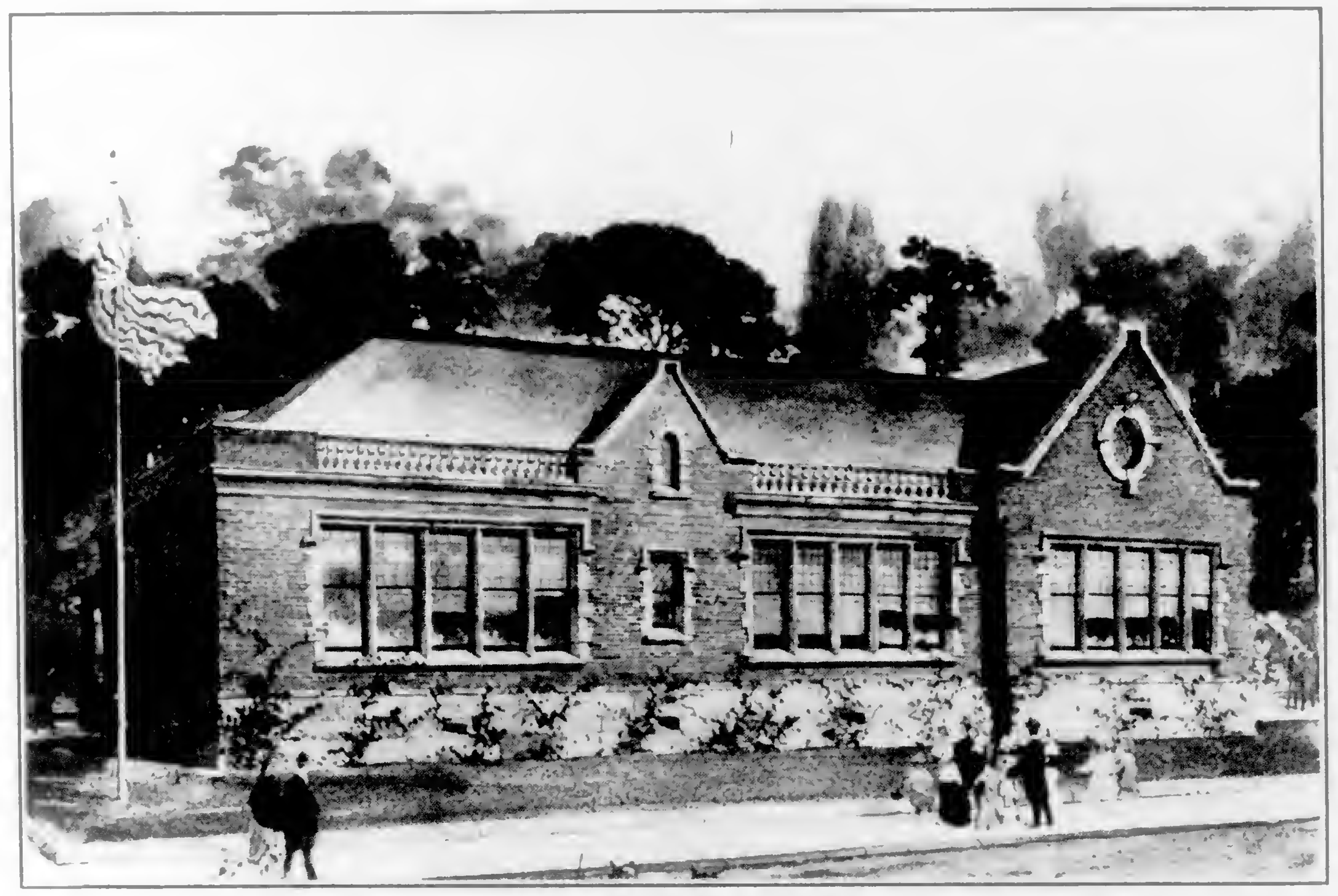

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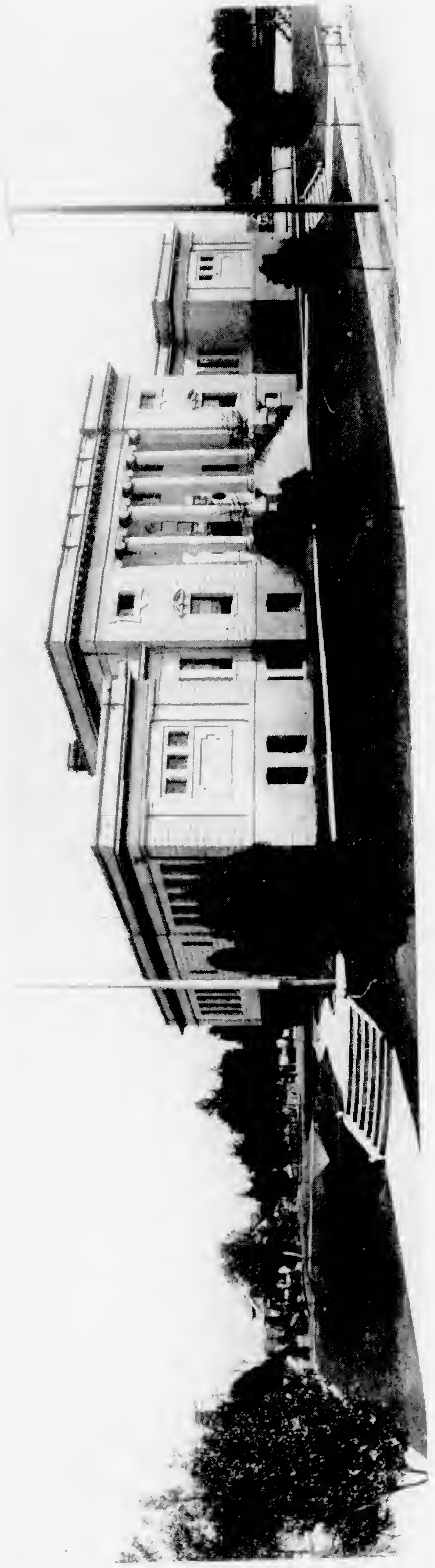

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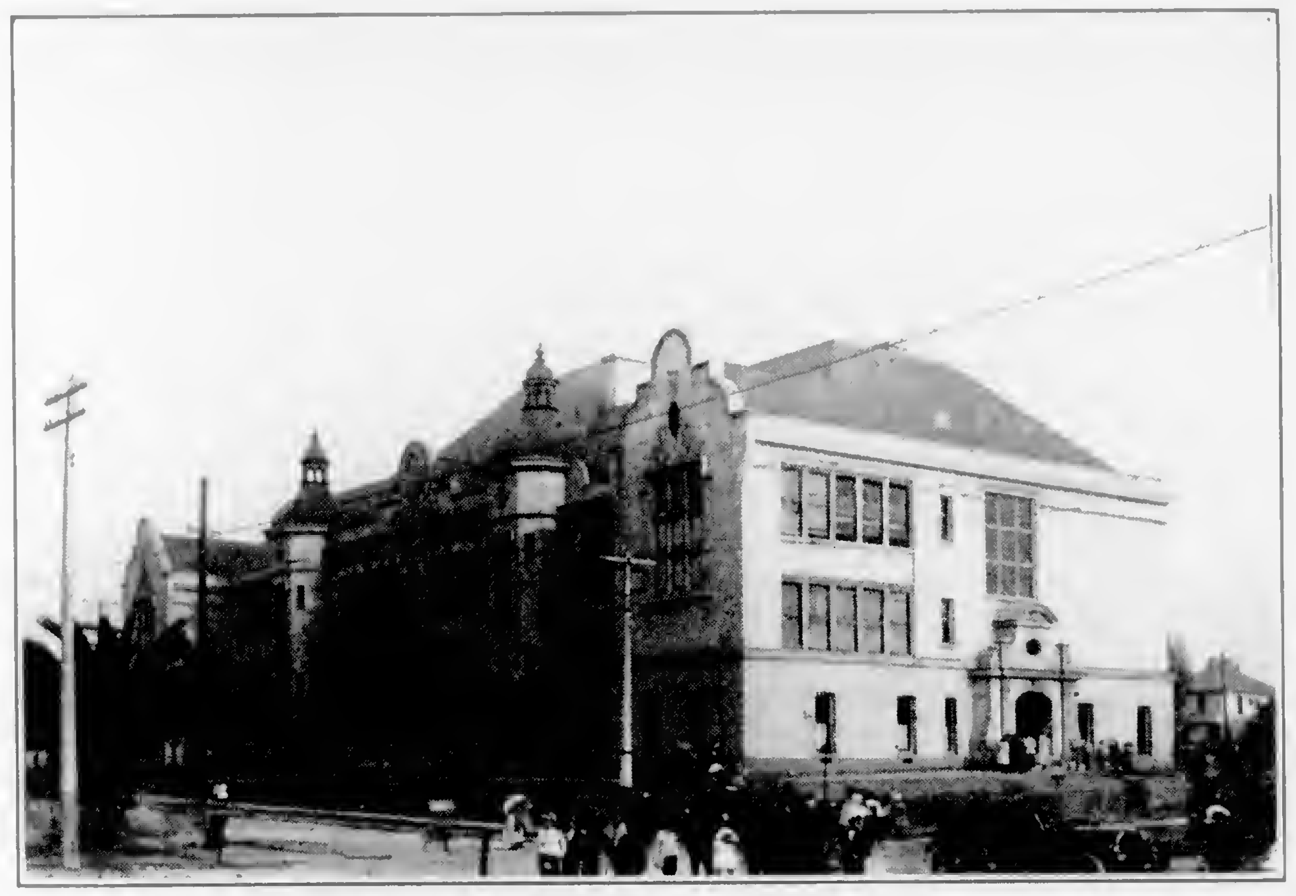
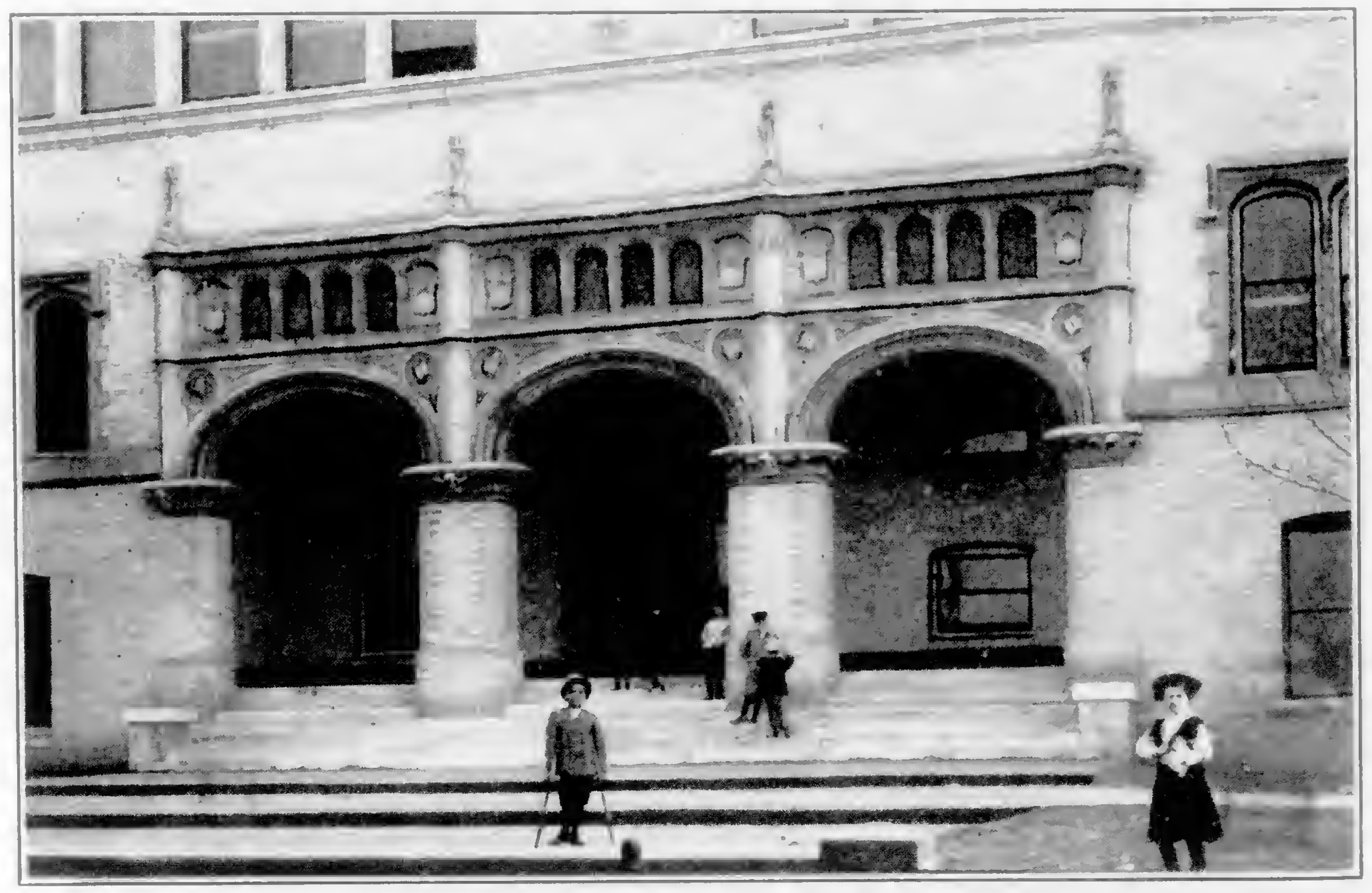
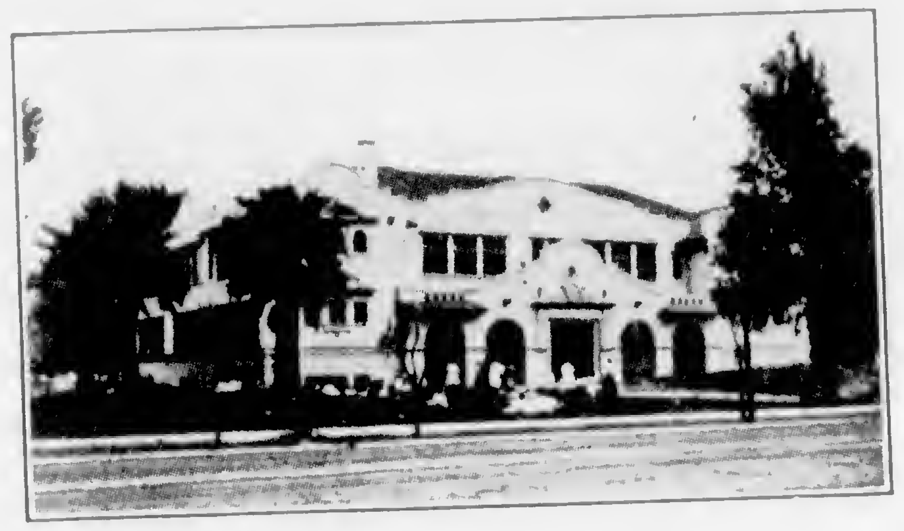


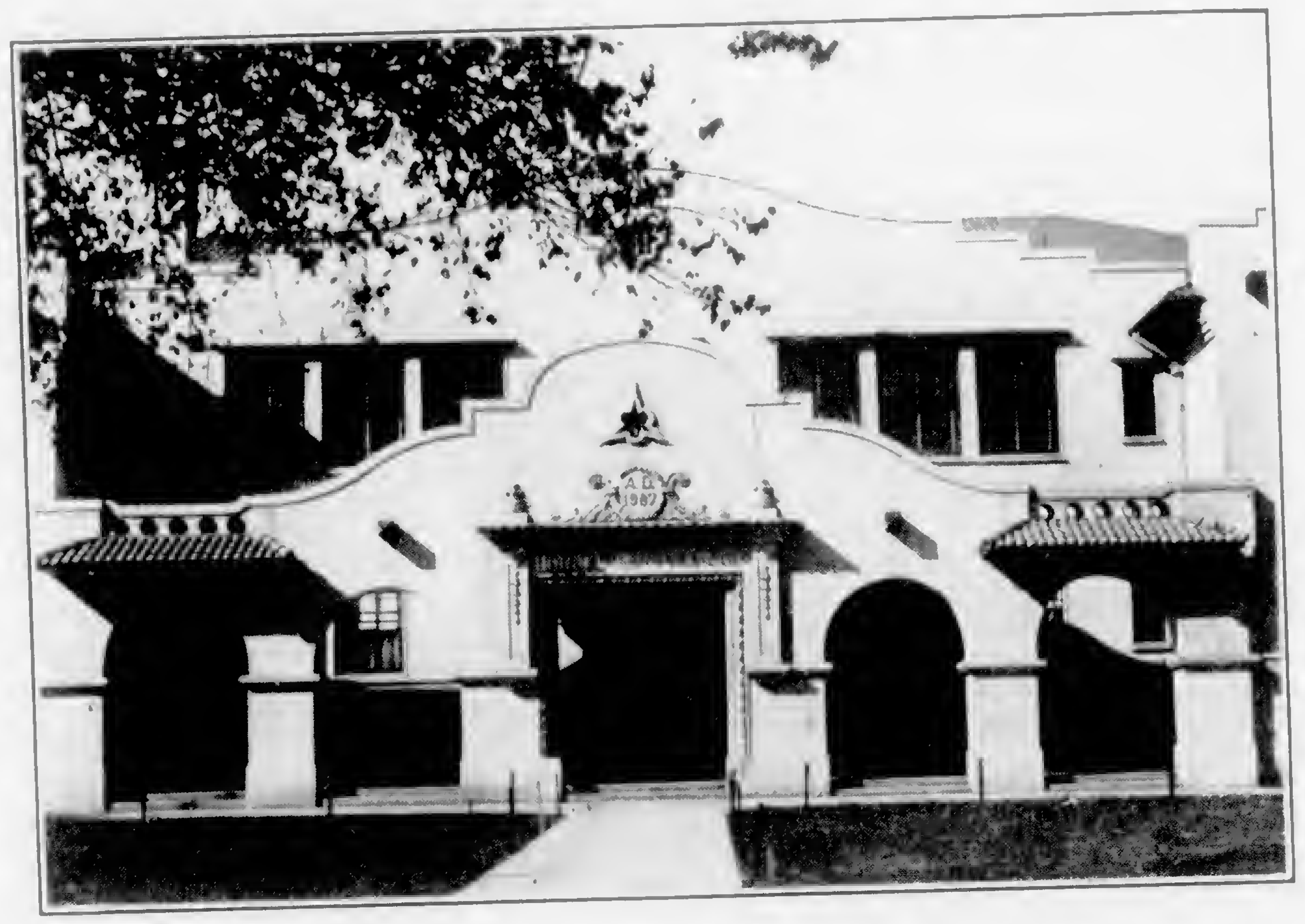
Franklin School Building, Oakland
Louis S. Stone and Henry C. Smith, Architects



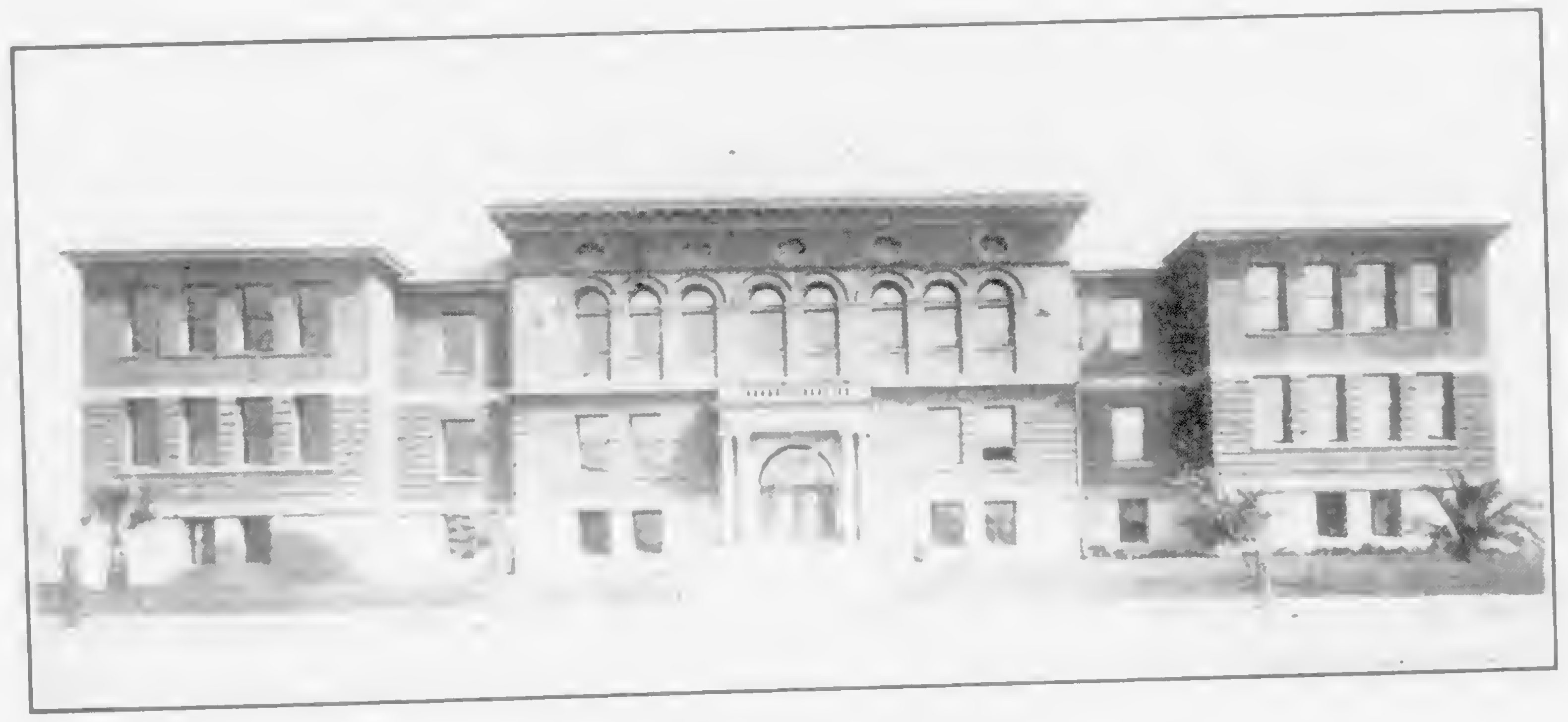
Entrance to Franklin School Building, Oakland
Louis S. Stone and Henry C. Smith, Architects



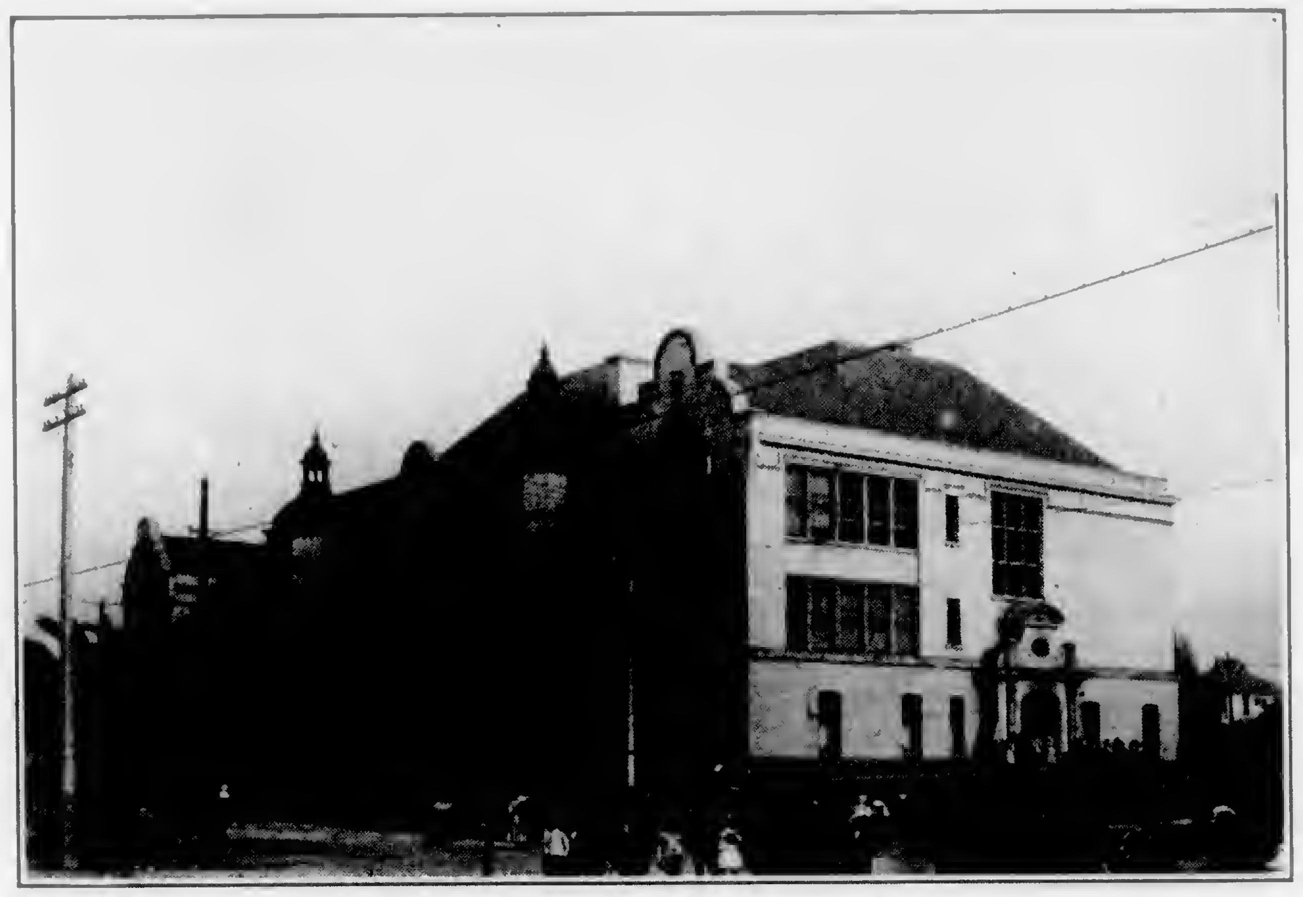
Horace Mann School



Entrance Horace Mann School, San Jose
Louis S. Stone and Henry C. Smith, Architects



Berkeley High School Building
Louis S. Stone and Henry C. Smith, Architects



Franklin School Building, Oakland
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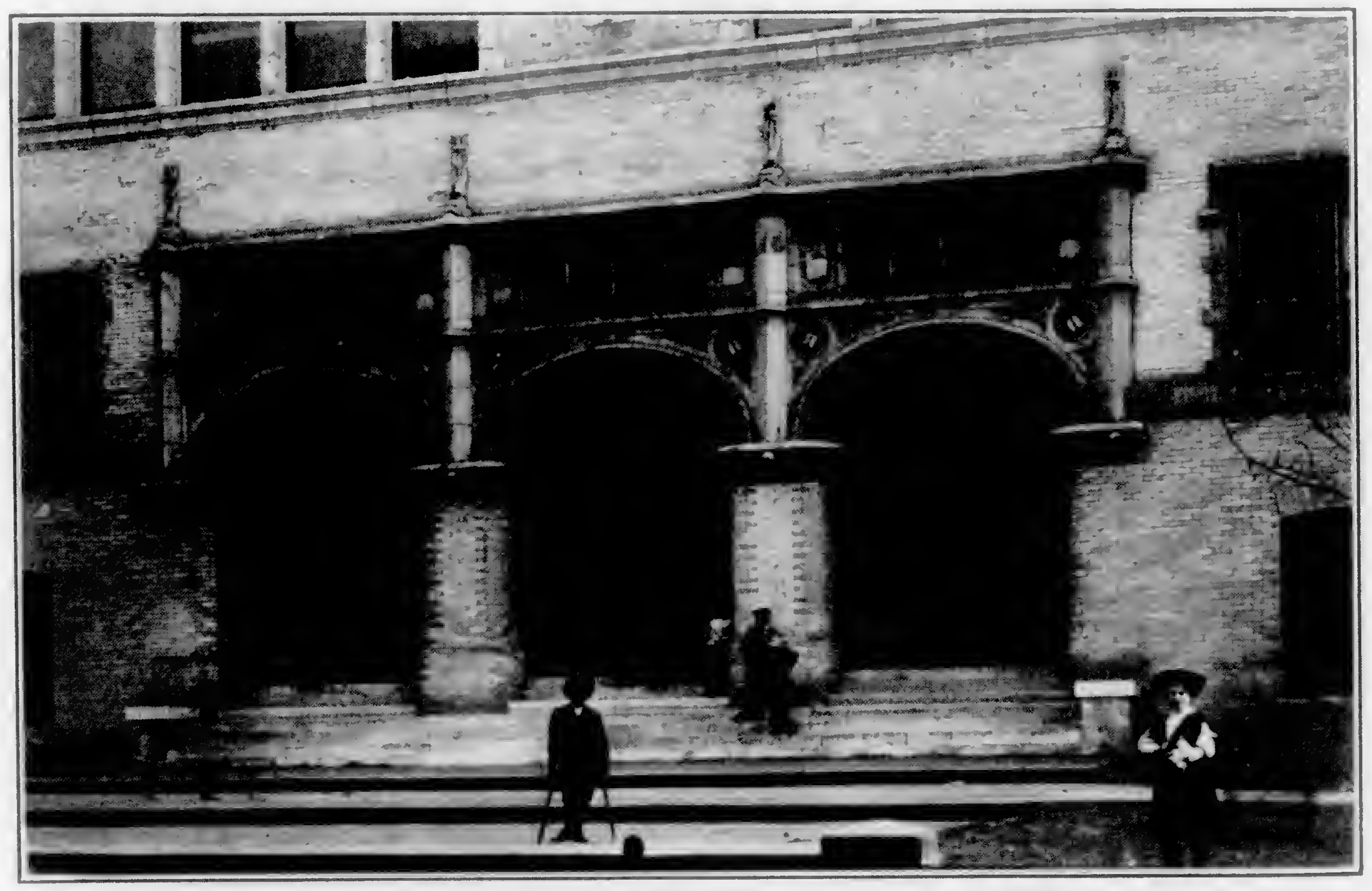

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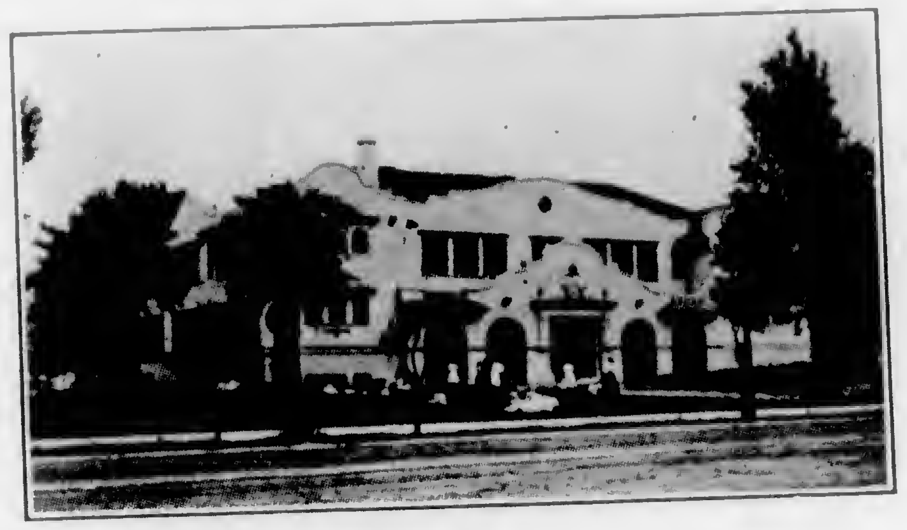
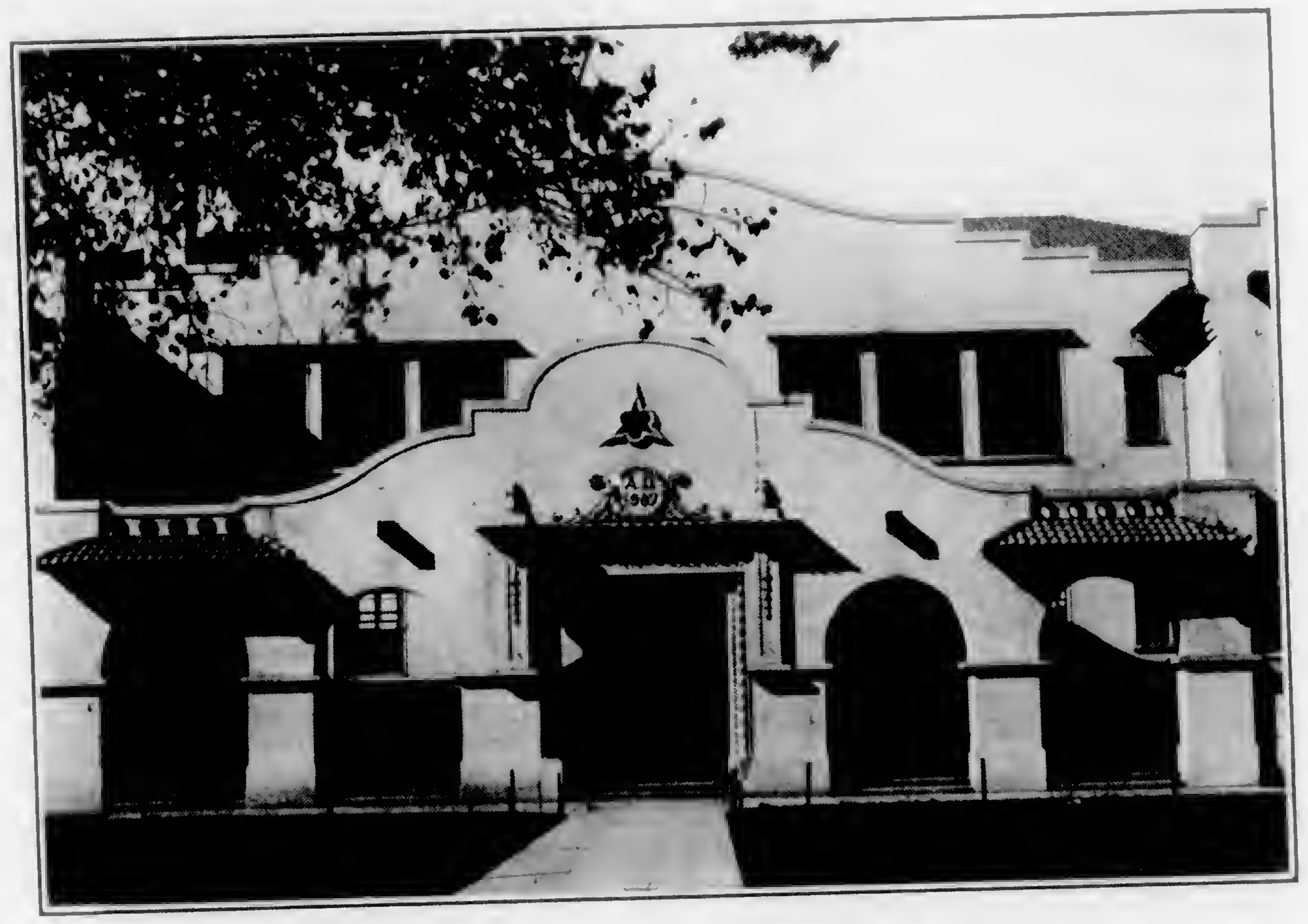


Horace Mann School



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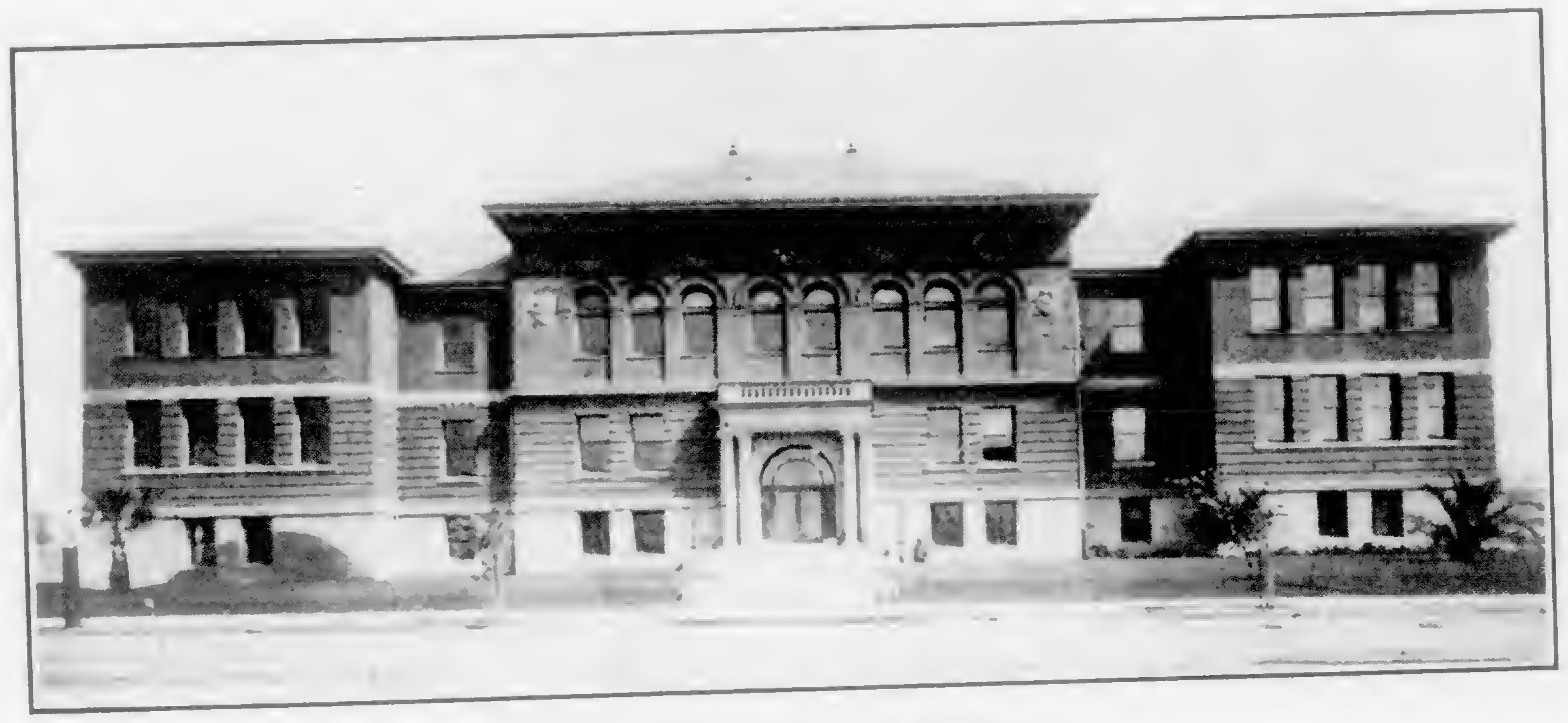

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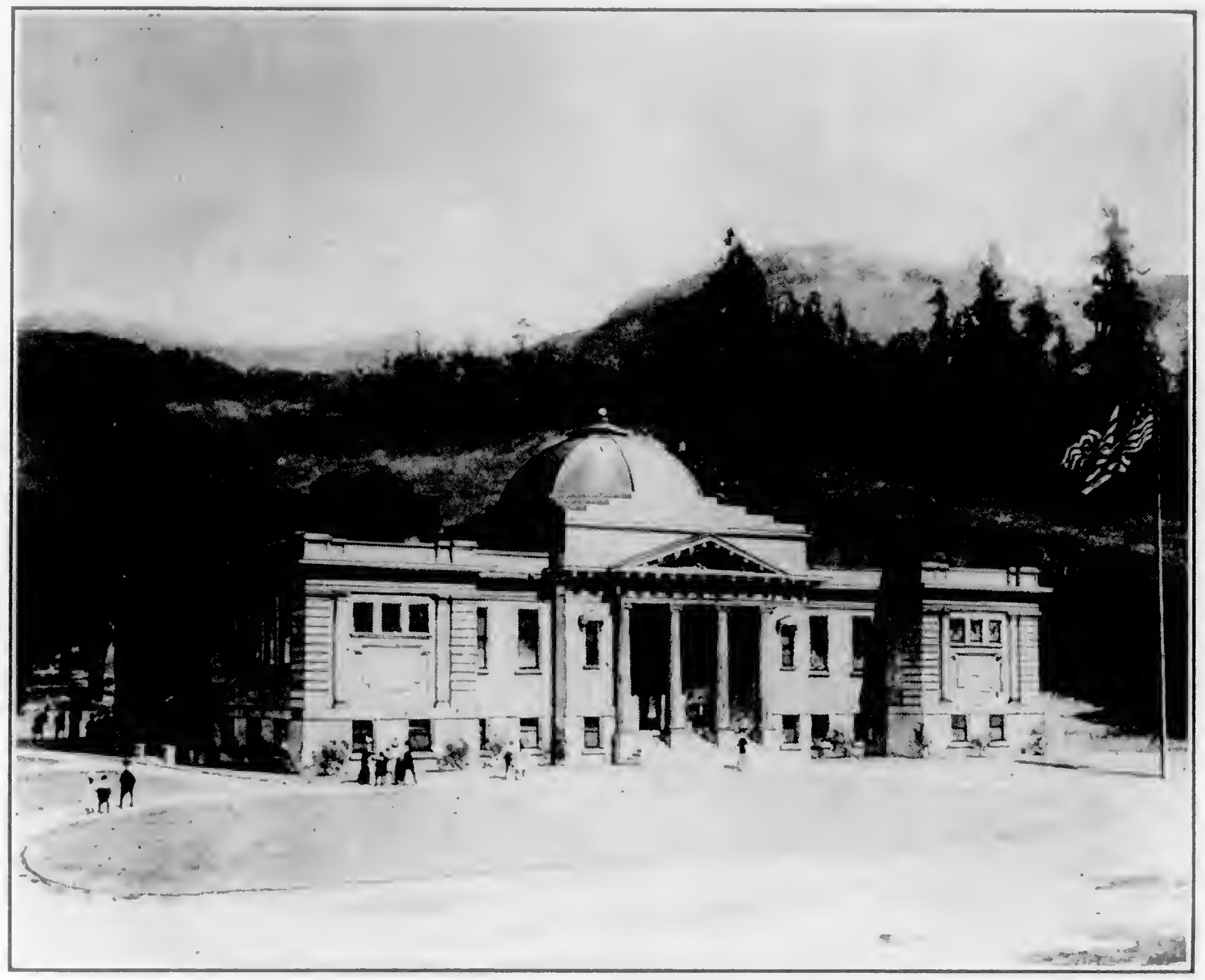
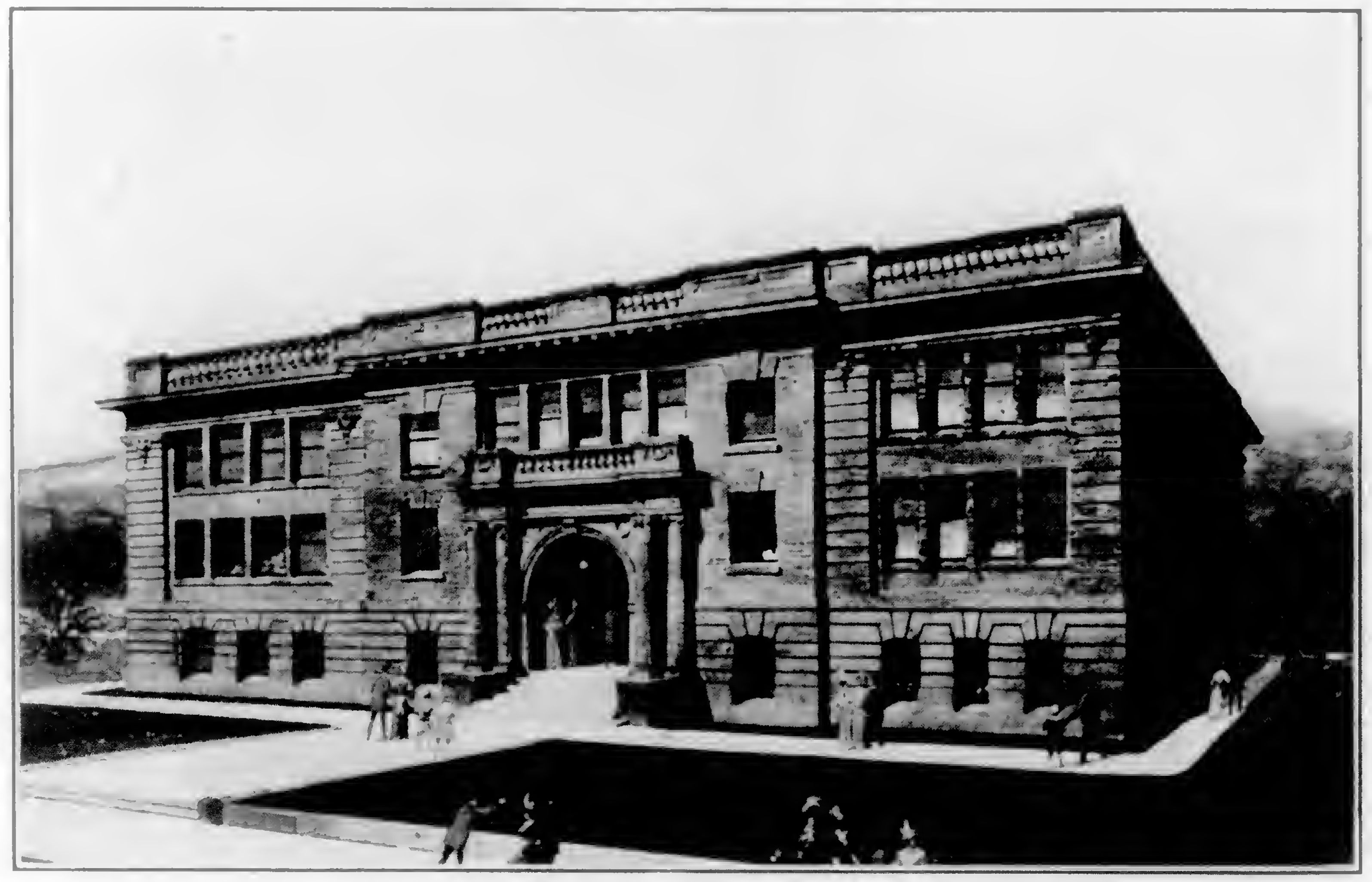
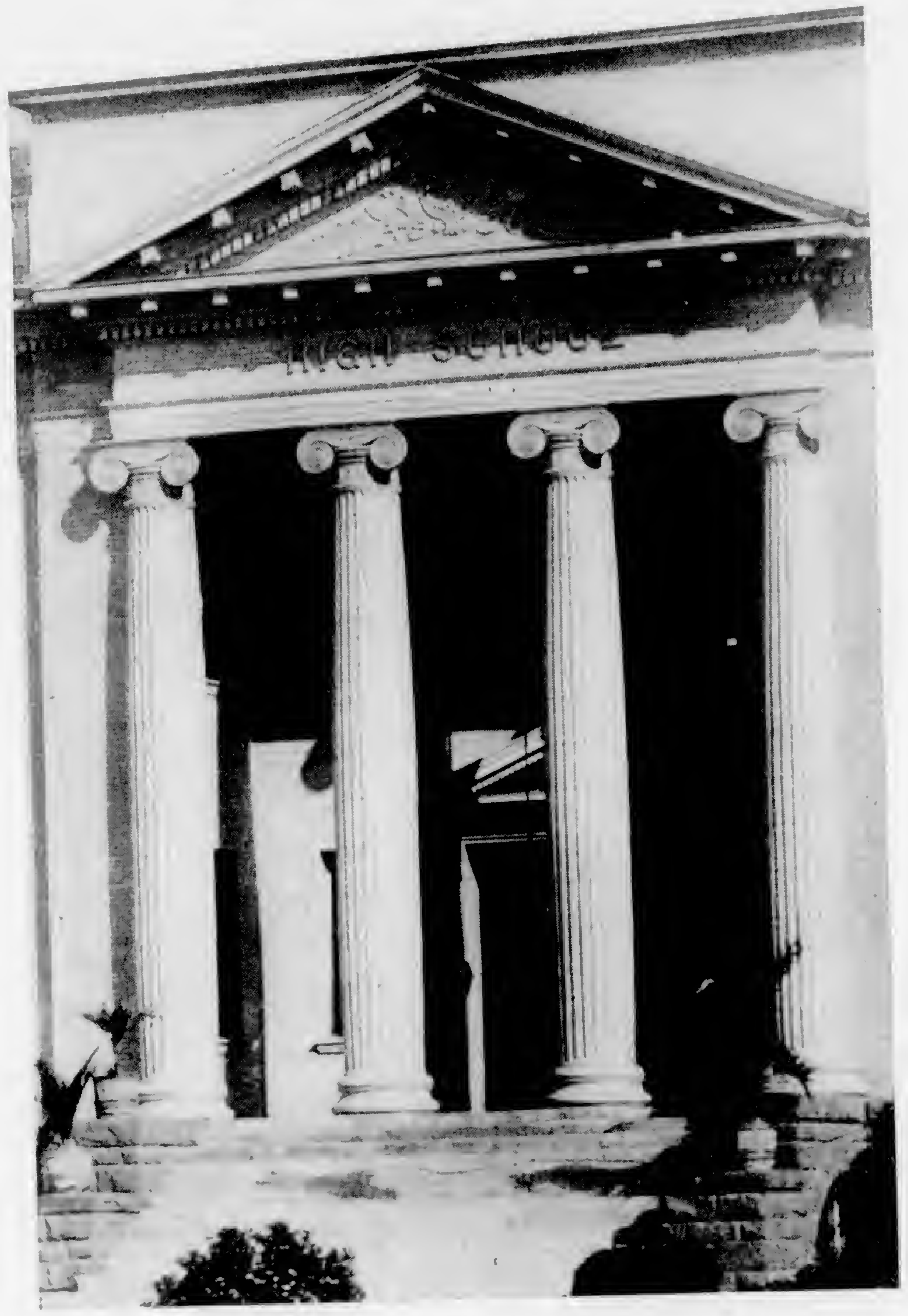


Sonora High School Building
Louis S. Stone and Henry C. Smith, Architects



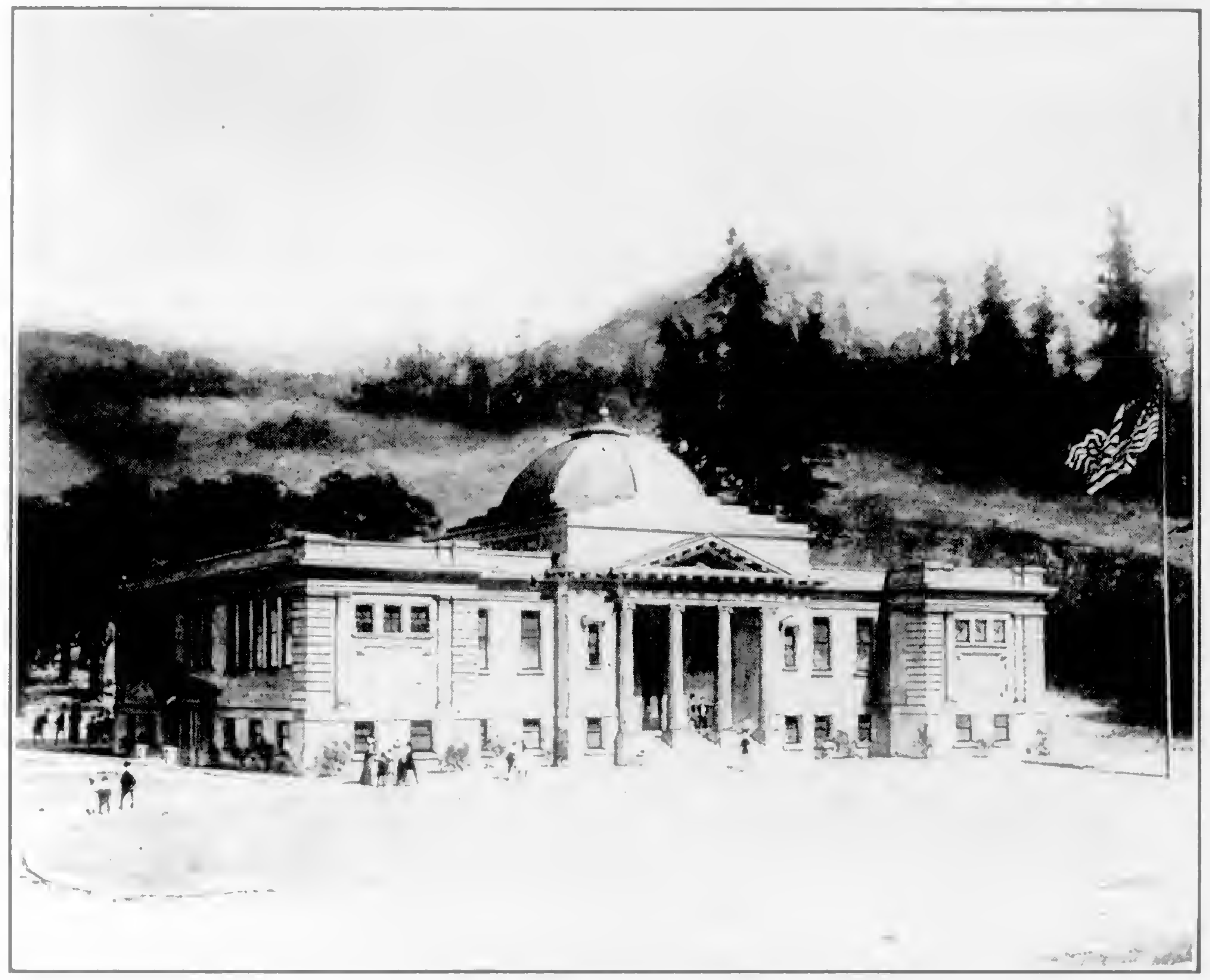
High School, Point Richmond, Cal.
Louis S. Stone and Henry C. Smith, Architects



Entrance Portico of Pasadena High School
Louis S. Stone and Henry C. Smith, Architects

or take the estimates of some local carpenter as a basis in making up the amounts required for a new building. The finished architect comes along later and finds that the authorities have under-estimated materially; then when plans are called for, the architects of standing stay out, and some young, aspiring, but inexperienced architect gets the work and finds he has to "skin" the building to death to get through. If school boards would first formulate an accurate idea of the size and quality of the building required, and then obtain preliminary sketches and estimates from some experienced architect, by far the best results would be obtained. The matter often rests with the architect, who through timidity or lack of knowledge, under-estimates the cost of the right kind of building, and invariably finds later that he is obliged to stint or cheapen his design or construction to keep inside the estimate.

An important improvement has been made in recent years in the arrangement of hat rooms. The hat room is placed to the rear of each class



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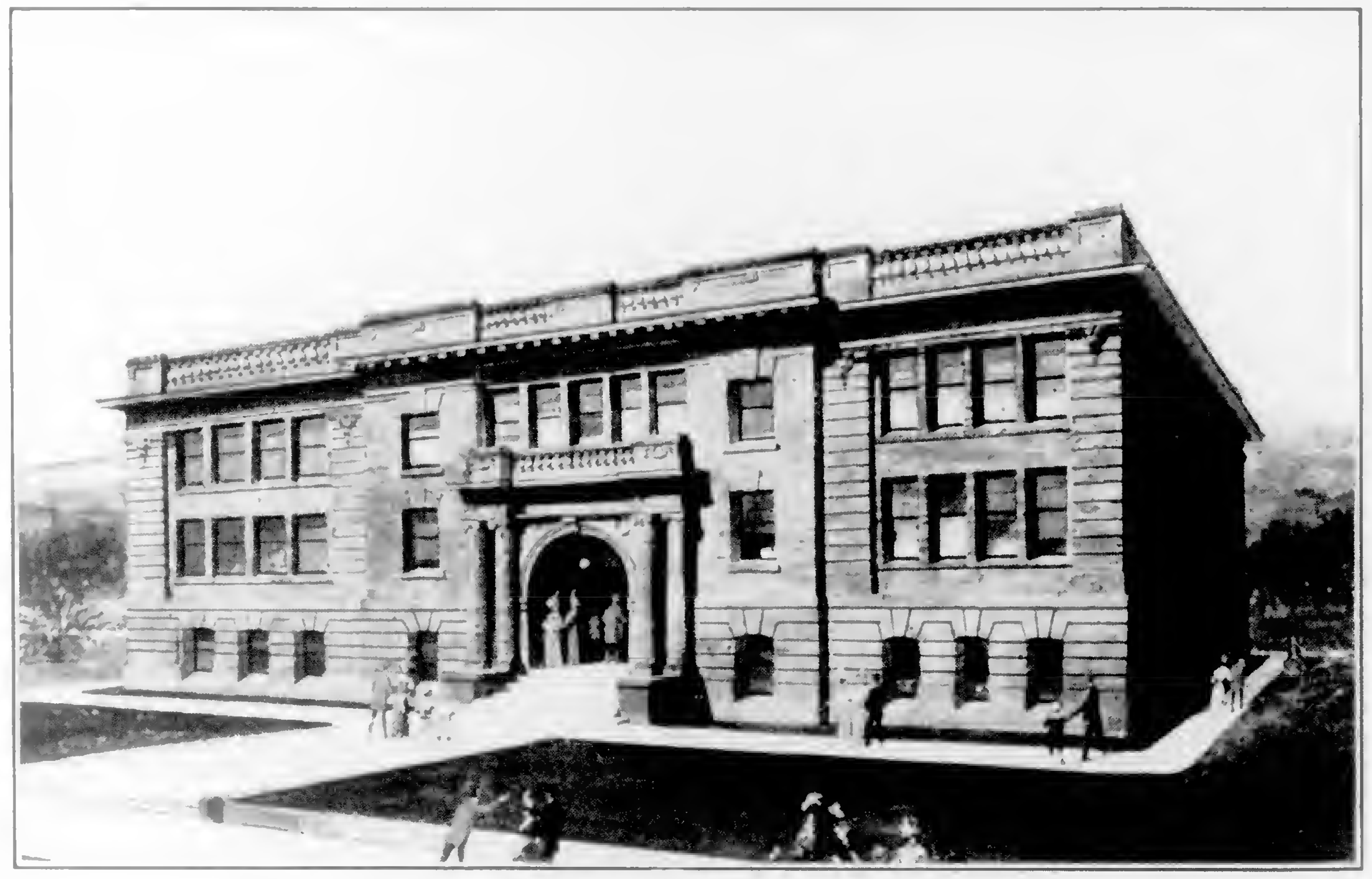

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HIGH SCHOOL

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Whittier High School
Louis S. Stone and Henry C. Smith, Architects

room, having a window on the outside wall. This room is entered at each side of the class room from the class room only. The air from the class room is forced through the hat room and out through a vent at the ceiling of same. This prevents any danger of the air in the class room being contaminated by that in the hat room. This arrangement of hat rooms also gives the teacher perfect control of the pupils. A very good plan is to have a window from the hat room to the main hall, so that while pupils are marching in and through the hat room they can be observed from the hallway.

It seems almost unnecessary to call attention to the fact that every two-story school building should have two or more stairways, well separated from each other. These staircases should be broken with roomy landings, and the riser and tread made very easy. The landings should be at least half again as wide as the stairway.

In class "A" school buildings the staircases are usually of concrete. In this case, non-slipping treads should be used.

There is need of ample exits from the first floor; time being a factor in the operation of the school.

The interior woodwork should be finished natural or stained with a dull finish. The finish should be designed with as few projections as possible. Every fillet, projecting panel or groove gives lodgment for dust and makes work for the janitor. The author has used flush doors to great advantage, they being both beautiful and sanitary, there being no projecting surface to collect dust. Maple floors, while costing more than pine, are the cheaper in the long run and should be used wherever the cost permits.

Much attention is now being given to details of school planning by the authorities and in a very few years it will be hard to find an incorrectly planned and poorly constructed public school building.

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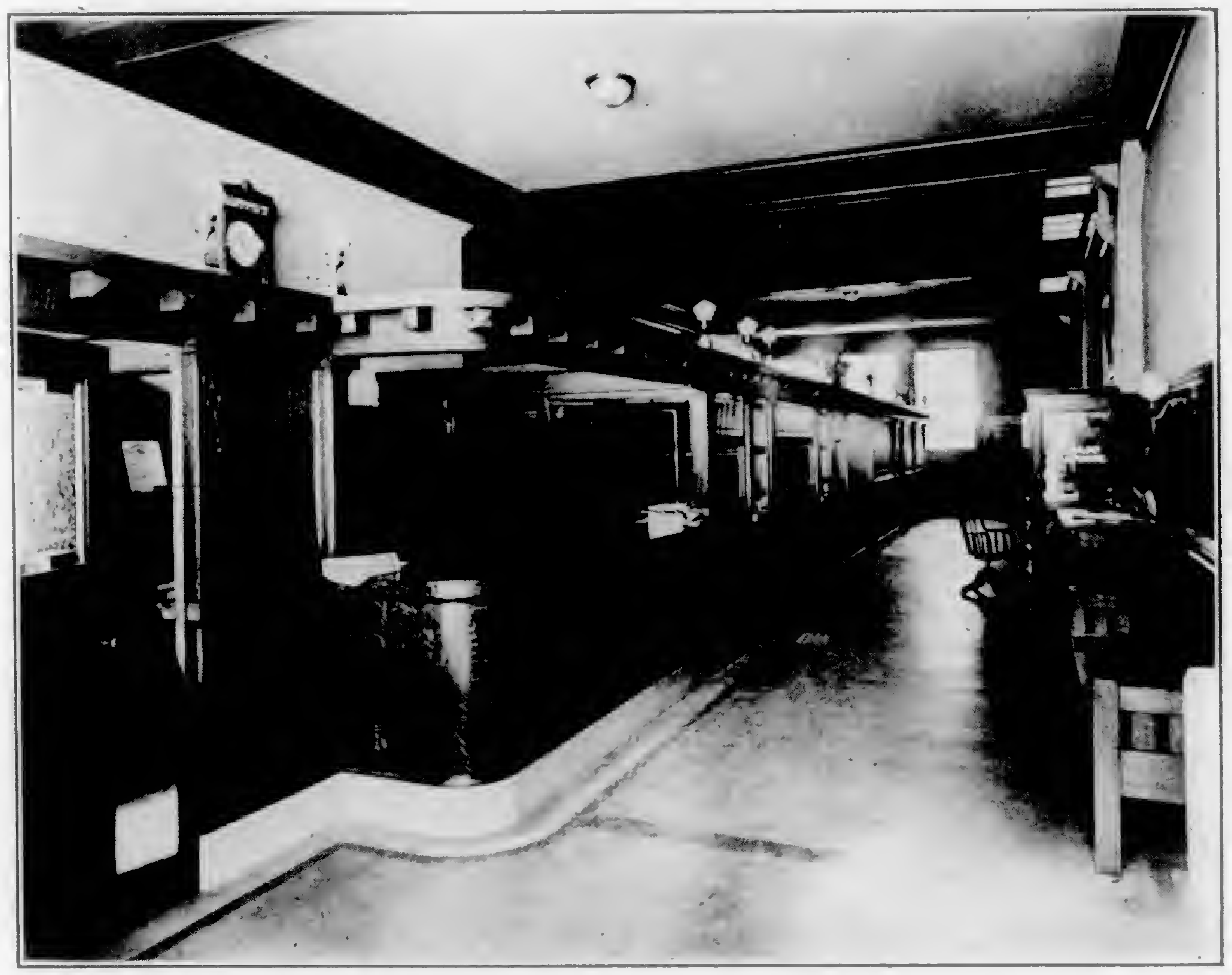

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Marble Staircase in Bellevue Hotel, San Francisco. Baxter Marble Company's California Marble Used Exclusively

Artless Architecture.

By F. W. FITZPATRICK, Architect.

F. W. Fitzpatrick, Architect

OFFICIALLY and sometimes gratuitously I have, metaphorically speaking, "hauled the architects over the coals" for a paucity of expression in their designs, a lack of truthfulness and of originality, a servile following of precedent that is absolutely meaningless when confronted with the conditions presented today, but it seems to me that however strenuous may have been that hauling, the coals were never quite as hot as those over which Mr. Gutzon Borglum is dragging them, and not once, but back and forth. Mr. Borglum is a sculptor of some renown and a gentleman who certainly can use scathingly cutting King's English with vitriolic effect. He has answered in the October Craftsman the question, "Why is there so little real art in America?" His entire paper is most readable, but I have space only to quote a few extracts:

"It is because, lacking in reverence, sincerity, and individuality, the monuments we have built are not our own. Because we have 'cribbed' every scroll and form we build. Because our architects and artists annually 'beat it' to Europe to gather ideas to restock their idea-less plants at home. Because our finery is of the Old World.

"We are traders—we peddle cotton, office, religion, and esthetics; we are laymen, who have remained untouched by the man of dreams, of ideas, or ideals. Our builders are our engineers. They are not architects, nor is it their business to build with the rounded form in their eye.

"But the architect, what of him? where his forms? Like a maid-servant, he draws over the great steel limbs, conceived as nature conceives, a drabbled chemise of pseudo-Greek, Italian, or Beaux-Art pattern, and in his water-color wash he appeals to the sculptor to model for him a few figures, cautioning him that they 'must be characterless,' 'just spots,' pure conventions—something that will go with his ornament. One sometimes wonders if he realizes how he condemns his work in so doing. He must know, and he is right—this business man—that it would never do to put a vital piece of sculpture upon one of his fretted fronts. He talks Greek art and traces its forms, but the ideals of Greece are not ours; we have too little in common with the yesterday two thousand years gone to make it possible that we wear its dress or that we use its symbols.

"I do not mean that America is without artists, sculptors, or even architects deserving the name—there are enough of each to give us beauty in such abundance that the lives of all of us would be better, sweeter, and fuller and more of us could have homes and work-rooms fit for gods to labor and to slumber in (for such shall be my shop and couch). But the common spirit in sculpture and architecture in America is at the top notch of mediocrity.

"There are three elements absolutely inseparable from the production of great art—sincerity, individuality, and reverence. Of reverence, I doubt

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"There are three elements absolutely inseparable from the production of great art—sincerity, individuality, and reverence. Of reverence, I doubt if there is enough in all the United States to build one great temple. I doubt if there are men enough in all this land with unselfishness enough, with love enough, together to build one great and beautiful temple for commerce or industry, for liberty or art, for religion or for masonry—built from the bottom up, beautiful and good, like an altar upon which the most sacred thing in our lives shall be offered to all the rest who follow.

"And yet we have many good men—good but good-for-nothing. New York is filled with honest men who dodge every opportunity nature or events toss them to better or make more beautiful their immediate hour or place, fearful of the possible jar to their accustomed ease. This is, in part, the reason of the winter in our esthetic life. It makes the hideous, grinding elevated roads as natural a product as weeds in a neglected garden. It assures us that each great bridge will be more hideously ugly than the last. It explains Brooklyn's apathy and how she can sleep so long with all the filth of a hundred years choking her front door—fouling the way to the most beautiful island nature has given all this coast.

"Were we more Latin or Norse this could not be so. Puritanism has made us selfish, self-centered hypocrites for so long that sincerity and reverence for what is natural and wholesome in our impulse have been fairly bred out of us. We do not revere nature. We wonder very little at the daily return of sun and moon and stars and the glory that accompanies each phenomenon. Look at our water-fronts, where our world—for this is the world to us—meets the sea. Is there a fishing-village anywhere that has not dealt with landings as well, as largely, with as broad a conception of the elements they were separating? And yet architects sit five deep around all these improvements."

The arraignment he makes is severe but it is well-grounded. Yet there are mitigating circumstances to be considered. We are but a young people and an essentially commercial people. Our time has been taken up heretofore in hustling, making a place for ourselves in the commercial world and we have had hardly breathing time enough to really think of art. Our people are just getting ready for it. Only now is there beginning to be leisure enough for even our wealthier class to dally with the frills and luxuries of life. While a man is digging for gold in the mines he can't very well be expected to give much thought to art, but when, after delving assiduously and gathering the glittering particles in sufficient quantity, he is justified in taking his ease and proceeds to surround himself with luxurious appointments, artistic environments.

Up to very recently we have been literally digging in the mines.

Then, too, the spirit of commercialism that recognizes only that which is useful and that which is profitable has made our people ultra-conservative and very regardful of precedent. An architect may have had noble inspiration and great yearnings to do something original, but his client has insisted upon something just like Mr. So-and-So's, a building modeled on some other one that has proven successful. Innovations, novelties, have not been desired.

And as for reverence for art or anything else, it has been drilled out of us. Reverence is eliminated in our schools. Youth is consulted as to what it shall do, as to what it likes, from so early a period in life that the spirit of equality controls even a youngster of three years of age. He is just as good as his father and just as free and just as important. Reverence is stricken from our curriculum. The boy thinks his father is a light-weight and knows that his teacher is an old sissy, and the grown man recognizes no superior and believes that even the laws were made but to be evaded or to subserve his own personal ends. And so it goes.

But we must be patient. Rome was not made in a day, nor did it become the great art center of the world until after it had made its conquests and established itself firmly in its commercial supremacy. So it is with us. We are fast reaching the point where it may be expected of us to do great things in the world of art. We have paved the way thereto already. As far as buildings go, no nation on earth has carried them to as high a degree of perfection insofar as conveniences and arrangements are concerned as have we, nor has any other people accomplished the feats of structural engineering that we have. And it will only be a little time before we can also branch out and make those beautiful without borrowing the finery of other times and other peoples.

I have supreme confidence in our ability to do the right thing when the right time comes, though it be a bit galling to have to wait. We did one thing some years ago for which we may be justifiably proud and which redeems us in our own critical eyes from many sins committed before and after the accomplishment of that particularly happy attainment. Fifteen years ago there was planned a great International Exposition, the Chicago World's Fair. It was an opportunity extraordinary, the event of an age. Architecture had been at low ebb and it was to be expected that the splendid opportunity would be fuzzled. But we rose to it sublimely. It was a case where we were justified in borrowing from classic ages, and we did and the resultant group was undoubtedly the purest, grandest, most dream-like and glorious aggregation of structures ever massed together in superb surroundings at any time or in any land. Our architects did it well. And, by the same token, they'll "find themselves" some of these days and evolve an architecture that is as suitable to our commercial cities as the classic was to the "dream-city" at Chicago.

The people admired those exposition buildings and found them just about right, and it is largely because of that popular prejudice toward classicism that our architects today try to adapt the same style to our skyscrapers and to our churches and to everything they build. They give us splendid details, "borrowed finery," as Mr. Borglum calls it, and the buildings please the untrained, the uncritical eye, though we know that it is absolutely ridiculous to cockle a Greek temple on top of a twenty-storied or thirty-storied office building, and to inject great collonaded facades where they represent neither rhyme nor reason and are, in fact, disadvantages to the buildings and where it becomes structural legerdemain to keep those columns in place that are really supposed to support something.

The lack of time has also been a terrible drawback to true art in architecture. No sooner is a building thought of than is the architect supposed to have its plans ready and the foundation under way. There is neither time nor opportunity for him to study, to evolve something beautiful. His entire time is taken in fitting the building for its commercial purpose, in making it a maximum revenue producer, and when it comes to the artistic part, why, the quickest and easiest thing to do is to put on the "drabbled chemise in pseudo Greek" that Mr. Borglum refers to, and that is right there at hand in every architect's library. As we get farther along our people will go at building projects more leisurely and our architects will have time to really design and make the dresses and will not have to resort to the borrowed chemise.

It takes a mighty bold man anyway to try and give a building a personal character and to clothe it in original, albeit sensible, garb. Indeed, few men with real ability to do it ever get the chance. Our ways of awarding commissions preclude it, for the time being, at least. In some projects competition is resorted to, but in that case the odds are nine to one that some one of the three or four regulation, stereotyped, alleged competition-experts will be called in to prepare the program and aid in the selection of the winner. Those men are generally dyed-in-the-wool school men, and with virulent prejudice toward the accepted and "proper" precedents they have always taught. They know their "pseudo Greek, Italian or Beaux Art" patterns and will tolerate nothing else. In going into such competitions we know just the conditions that confront us; we know that if we do do anything a little out of the beaten path, not exactly according to the Hoyle of those exalted experts, why, our drawings will be thrown out incontinently. We don't design the building as we think it ought to be, but try, rather, to make it conform as nearly as we can to the whims and crotchety quirks of the judge. It is not sublime on our part, but is essentially human. We want the job and that's the only way to get it. If it isn't given out in competition and is of real importance, the fellow who would try to give it artistic expression has but a slight show at it. The big commercial architect, with his long list of successful banks and other buildings to exhibit, will carry off the persimmon. He has a huge office or shop and can guarantee to turn out the plans inside of twenty-four hours, if need be. The building will be convenient, a commercial success, so what matters it if it be a stock pattern and is figuratively and literally an affair of so many yards of design of essentially a job-lot pattern? But we'll get over all that in course of time. Even today we see little rifts in the clouds here and there. All we have to do is to hold tight and pray and do a little fasting, and work and study like the mischief the while, and all will be well.

Why, bless you, Mr. Borglum laments about the "unartisticness," so to speak, of our water-fronts, of our elevated roads, of our cities generally. His complaint is well-grounded, but just think of what has been done in the corrective direction within the past five years. But little before that people laughed at me and scorned me for my efforts to have an Art Commission appointed to keep our National Capital within sensible bounds. But we persisted in it and secured a fixed and artistic plan to which is conforming every building and public work that materializes. City after city has followed suit and today sixty-three cities and considerable towns are consistently and sensibly at work redeeming themselves from the municipal hideousness into which they had degenerated!

Sure, there is hope.

* * *

Mechanical Problems of the Skyscraper.

THE advent of the six-hundred-foot building has called for an important readjustment of the mechanical transit problem for skyscrapers. The result is a new type of elevator called "the traction," with power machinery located above the shaft instead of in its accustomed place in the cellar. To create ample safety devices for the cars of such a system is a serious problem. The possible precipitation of a carload of passengers from a six-hundred-foot height is not a pleasant thing to contemplate. It is only fair to say, however, that the number of passengers carried in them daily is not large, and also it may be asserted that contractors supplying such installations are of the highest reliability.

Another development which has been brought about in building construction by the very tall building is a scientific treatment of foundations. The execution of this branch of building construction now proceeds from a corps of specialists with adequate equipment to construct as well as design foundations to support the most gigantic superstructures. Fortunately, rock-bottom is not beyond human reach and the stability of the building is biblically assured. And if our present development continues we shall have to go still higher to gratify our ambitions, outreaching the Tower of Babel, but without its disastrous consequences.

Why Gravel Roofs Are Fireproof.

By J. R. D. MACKENZIE

IT IS safe to say that 90 per cent. of all modern fireproof structures now being built have roofs of felt, composition and gravel—more commonly known as gravel roofs. The great San Francisco fire of April, 1906, furnished more conclusive proof than it is possible to get by any so-called "tests," of the peculiar virtues of this form of roof in resisting fire. At that time the St. Francis Hotel, Grant building, Shreve building, Mercantile Trust building, Union Trust building, California Casket Co. building, Merchants' Exchange and Mills building, all of which were burned out inside, carried gravel roofs which successfully withstood the great heat from within and without. The postoffice building and the Kohl building were roofed in the same way, and this roof was undoubtedly a large factor in enabling these buildings to stand the splendid fire test they went through.

Unquestionably no form of roof was ever given a more thorough and practical "fire test" than was given the gravel roof by the San Francisco fire.

In the East, where gravel roofs have been in use for over fifty years, they are considered much more desirable fire resistant roofs than tin and natural slate, as the gravel roof is practically unaffected by heat that would destroy either of the other materials.

Chief Engineer John Stagg of the Paterson, N. J., fire department, in his annual report, published in the Paterson Morning Call of April 24, 1908, speaks in the highest terms of praise of composition gravel roofing. The National Association of Master Composition Roofers is using his report as an advertising medium to increase the use of this class of roofing. I print certain extracts from Mr. Stagg's report and let his remarks speak for themselves: "As requested last year, we again ask that all tin roofs be taken off the buildings and roofs of gravel or slag be placed on instead."

"We believe there is a general feeling among practical men in the fire department that a gravel or slag roof is far superior to tin or iron, for the following reasons:

"First—In the case of large fires, if there are buildings adjoining having metal roofs, it is necessary to watch those buildings, both on the inside and outside, for there is often sufficient heat to ignite roofing boards without any evidence of fire showing on the surface of the roof.

"Second—With the gravel or slag roof the boards cannot take fire until the felt and pitch has been consumed, as the felt is a non-conductor.

"Third—A gravel or slag roof holds water better than a metal roof, that is, the surface being rough, the water does not run off as rapidly and it requires wetting down less often.

"Fourth—A gravel or slag roof will confine a fire in a building longer than a metal roof. The roof boards must burn away entirely, before the flames have any serious effects on the felt, and then considerable time must elapse before an opening in the felt will occur. The solder in a tin roof will melt in the early stages of a fire, causing the metal itself to curl and open the seams.

"Fifth—It is very easy to tear off or cut through a gravel or slag roof when it is necessary to reach the burning portions of a building through the roof."

L. P. Sibley, secretary-treasurer of the National Association of Master Composition Roofers, is following up this lead and is trying to get the chief engineers of the different fire departments all over the country to express their views. If they are all of the same opinion as Chief Engineer Stagg, of Paterson, Mr. Sibley will have some very strong arguments to present why composition gravel roofing should be used.

Building Inspector T. A. Winterrowd, of Indianapolis, Ind., in investigating the question of proper roofings, growing out of his desire to draft a more effective building law, has received many voluntary declarations from representatives of both metal and composition roofers that their different products have proved to be the only fireproof material.

The National Association of Master Composition Roofers writes to Mr. Winterrowd, in part, as follows: "Composition roofing, better known as coal-tar pitch, felt and slag or gravel, covers more of the first-class buildings and factories of this country than all other forms of roofing put together. The most prominent architects and mill engineers have used it for fifty years and it has always been accorded the base rate of insurance and has the confidence of fire fighters everywhere. Its enviable position makes it the focus of the attacks of all special roofing promoters. This attack and agitation, however, does not prevent the metal roofers themselves from having on their own buildings what they know to be the best roof for all purposes—a composition roof—and there is not a large city in the country but that contains abundant evidence of this fact. Metal roofers certainly do not have composition roofs put on their own buildings if it adds to the fire risk or cost of insurance.

"Tests made show that a gravel roof laid on seven-eighths inch matched boards resisted a conflagration temperature of 1400 degrees Fahr. for fifty-four minutes before the boards burned through, while with a metal roof tested under the same conditions the boards burned through in just twenty-two and one-half minutes. With a fire inside the building, the composition roof again shows its superiority. It remains cool to work upon and lasts, as all firemen know, until all the supports have been burned away and it drops down, still intact, into the cellar below. A metal roof, on the other hand, becomes burning hot, unsolders and lets the draft through and is a danger to the fireman, while he can work on a composition roof to the last, easily cutting holes through the felt and pitch to flood the interior."

The letter closes with this peroration: "Everything considered, there never has been so satisfactory a roof from the point of view of all concerned as the composition roof. The owner knows he is getting the best roof for his money, the architect and engineer know that it is the best and most lasting roof, while the insurance man and the fire fighter know that a composition roof is the best fire resister."

* * *

Athletic Brick.

Says a small town paper in Iowa: A car load of brick arrived yesterday, for a walk through the park.

* * *

He was telling her about the members of his ball team. "Now there's Brown," said he; "in a few weeks' time he'll be our best man."

"Oh, Jack!" she gushed, "this is so sudden; but what a nice way to ask me!"

* * *

Much trouble is caused in this world by throwing mud at the hornet's nest. Some people don't seem to be happy unless they are trying to get stung!

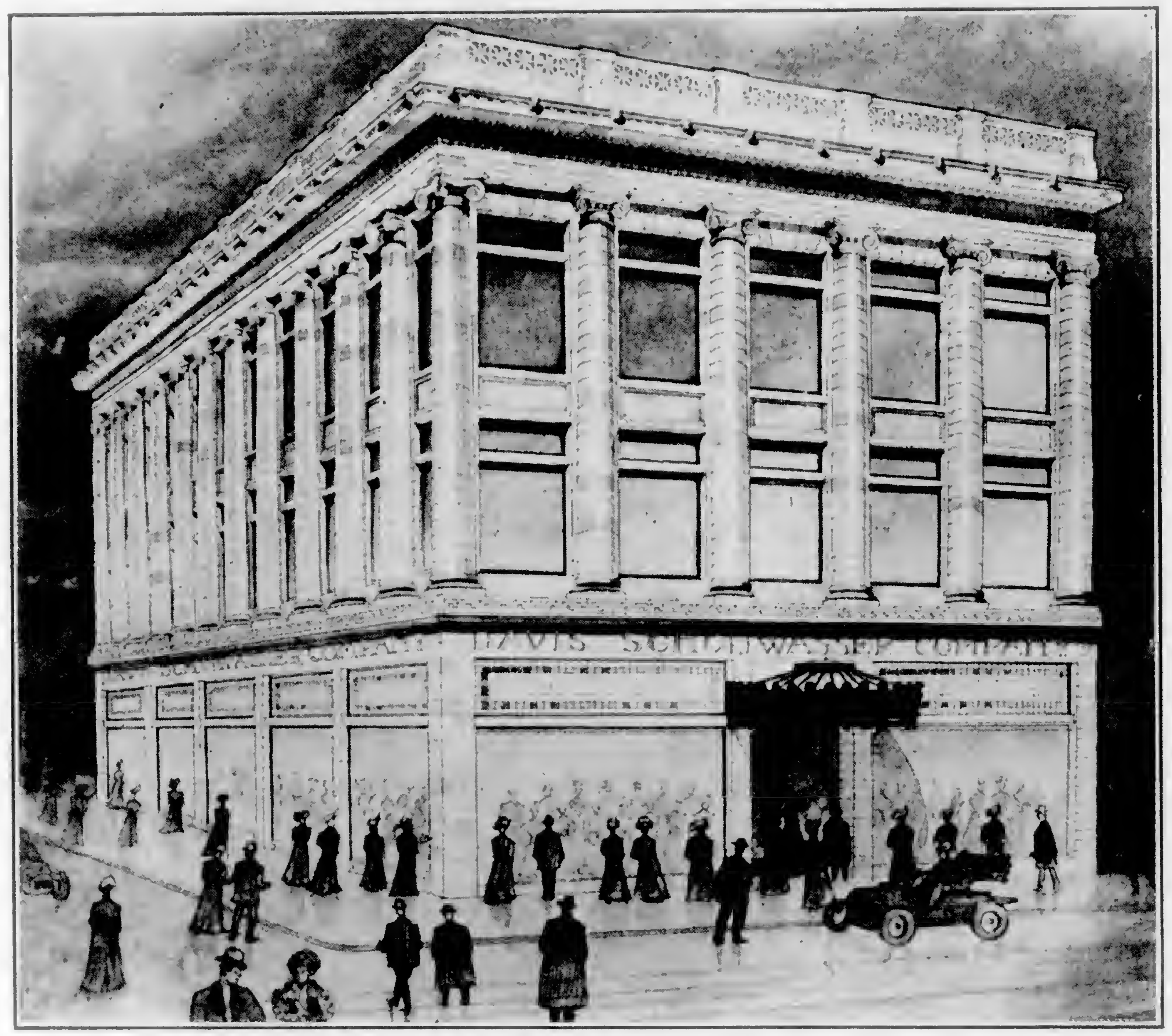
Medusa White Portland Cement

By ERNEST LOESSEL

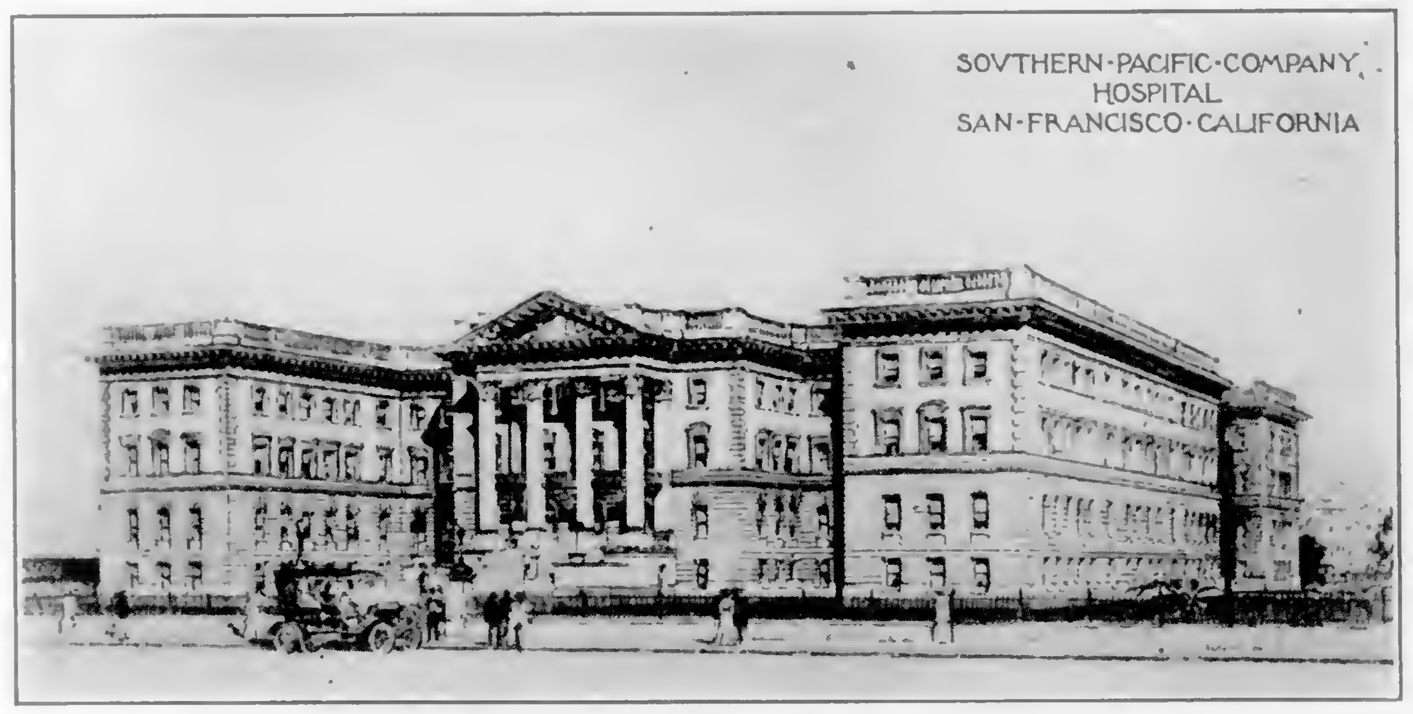
SO MANY inquiries concerning Medusa White Portland Cement have been received by the Architect and Engineer, that it presents to its readers the following general information about that material:

Medusa White Portland cement is the discovery or invention of Spencer B. Newberry, an international authority on the chemistry and manufacture of Portland cement. The product is the result of over fourteen years experiment with a suitable deposit found in eastern Pennsylvania.

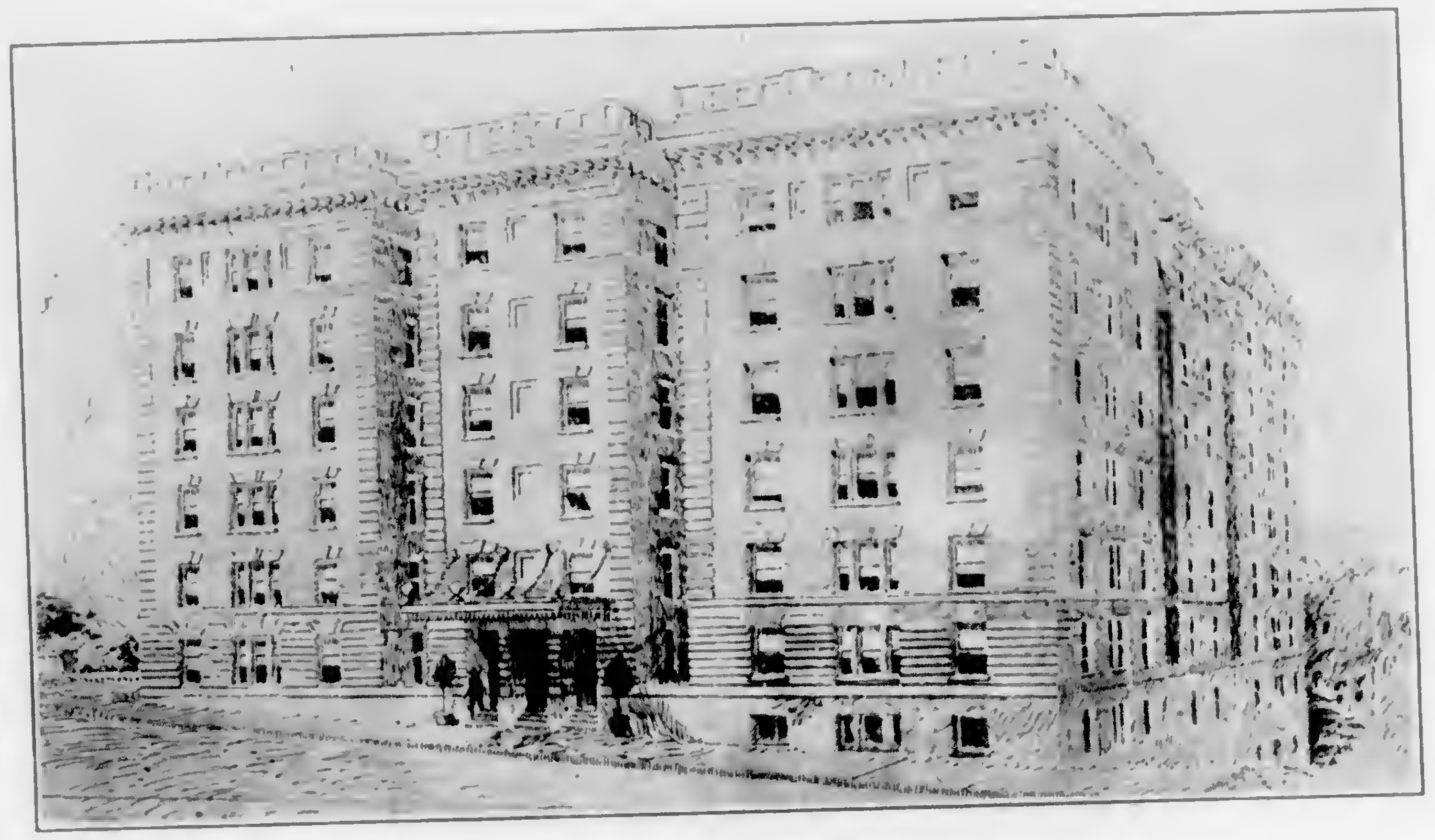
Medusa White Portland Cement exhibit of the Sandusky Portland Cement Co., at the recent Display of the Concrete Association held in New York City.



Davis-Schonwasser Building, San Francisco
MacDonald & Applegarth, Architects.



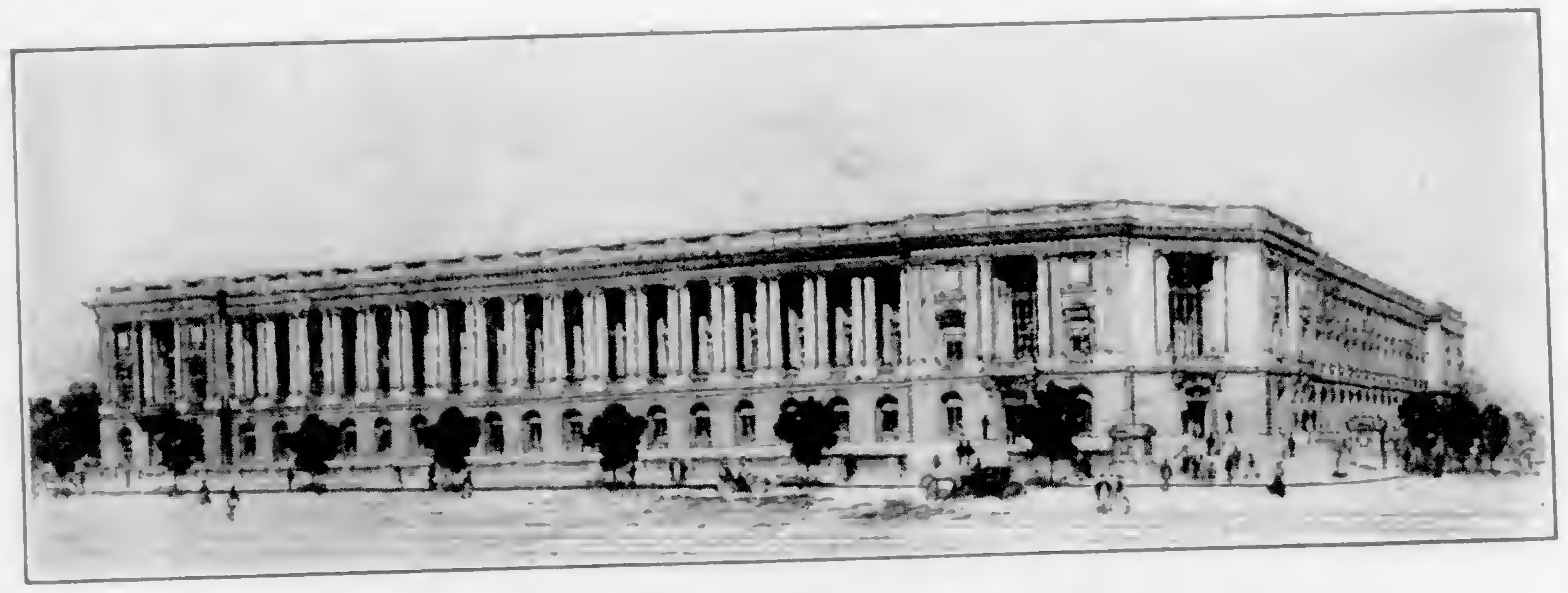
Southern Pacific Hospital, San Francisco
D. J. Patterson, Architect



Keystone Apartments, San Francisco
Oliver & Foulkes, Architects

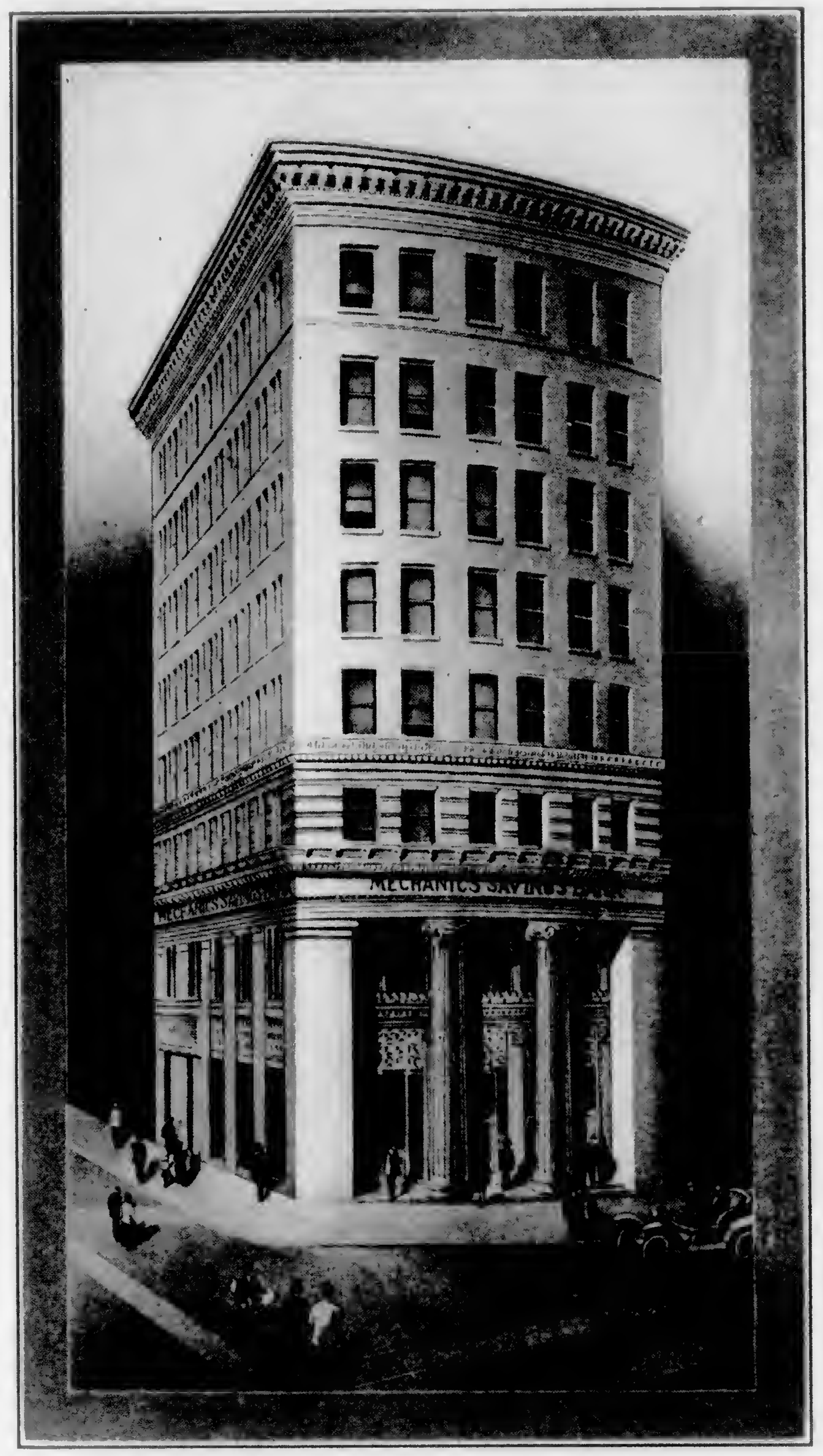
It is manufactured by the Sandusky Portland Cement Company, one of the largest manufacturers of Portland cement in the United States. Two years ago this company built a special mill at York, Pennsylvania, for the exclusive manufacture of Medusa White Portland. The product found immediate favor with architects throughout the country and it has already been found necessary to greatly increase the capacity of the mill.

The product is handled in California, Nevada, Utah and Arizona by The Building Material Company, Inc., Monadnock building, San Francisco, and in Washington and Oregon by F. T. Crowe & Co., 1 Front street, Portland, 411 Globe building, Seattle, 164 South Madison street, Spokane, and 1105 "A" street, Tacoma.



Office Building, House of Representatives, Washington, D. C.

While white cements which will at least temporarily withstand the corrosive influence of the elements are not unknown, and a number of German, French and English brands are on the market, these white cements are "slags" or "grappiers," which are quite different in their strength, setting, hardening and perishability to Portland cements, and, except for superior weather-proof qualities, are little better than lime, being in fact but the specially treated residues of hydraulic lime manufacture.

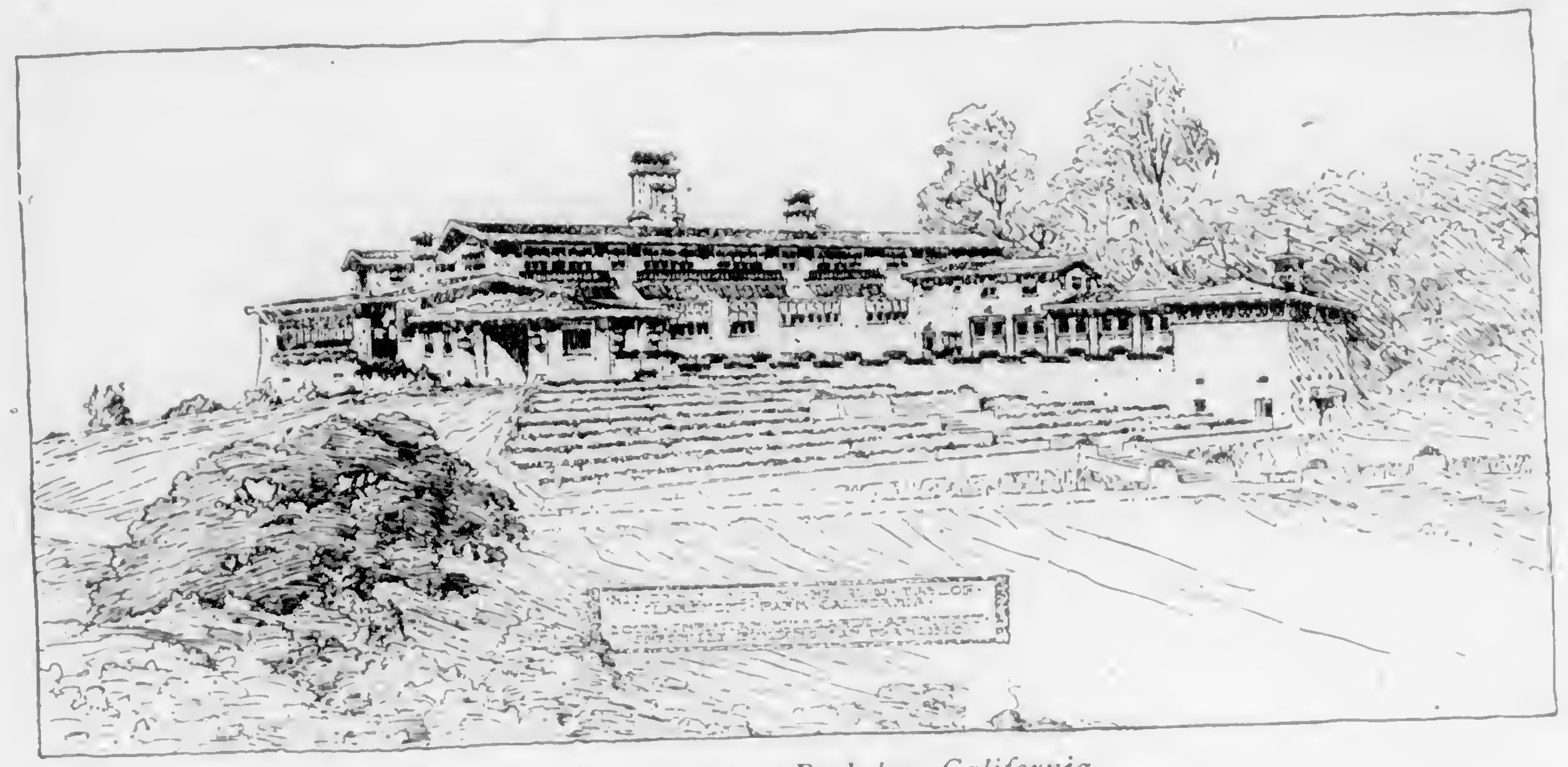


Mechanics' Bank Building, San Francisco
L. B. Dutton, Architect

The following are analyses of Medusa White Portland cement and of a typical Lehigh Valley gray Portland:

	White Medusa. Per cent.	Gray Lehigh Valley. Per cent.
Silica Si O_2	25.10	21.31
Alumina Al_2 O_3	5.05	6.89
Iron Oxide Fe_2 O_3	.43	2.53
Lime CaO	65.68	62.89
Magnesia MgO	1.54	2.64
Sulphuric acid SO_3	.96	1.34
Loss on ignition	1.24	1.39
Other constituents	.....	1.01

These analyses show that the chemical constituents of Medusa White Portland cement are the same as those of typical good gray Portlands. Note, however, that the White Medusa contains but a faint trace of iron oxide.



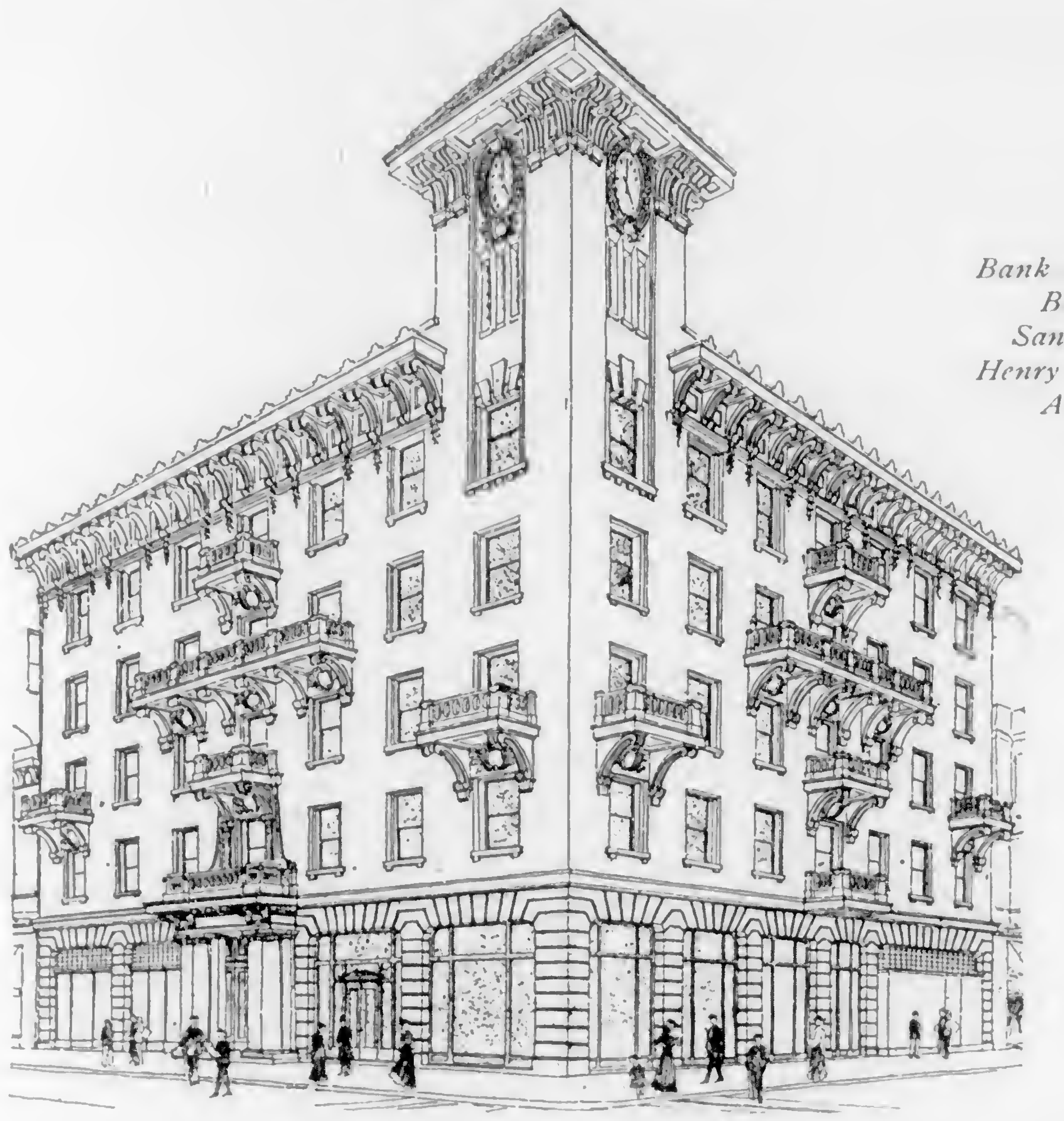
Taylor Residence, Berkeley, California
L. C. Mullgardt, Architect

First National Bank Building, San Francisco
D. H. Burnham & Co., Architects.

The following tests taken from a test sheet of the Henry S. Spackman Engineering Co., of Philadelphia, show that in fineness, setting and strength, the White Medusa is equal to the best grades of gray Portland.

Fineness: Passing No. 100 sieve, 94.5 per cent; passing No. 200 sieve, 76.5 per cent.

Constancy of volume test: Normal Pat. Test Am. Soc. Civ. Engrs. Cold water Pat., good, air Pat., good.



Bank of San Jose Building
San Jose, Cal.
Henry A. Schulze, Architect

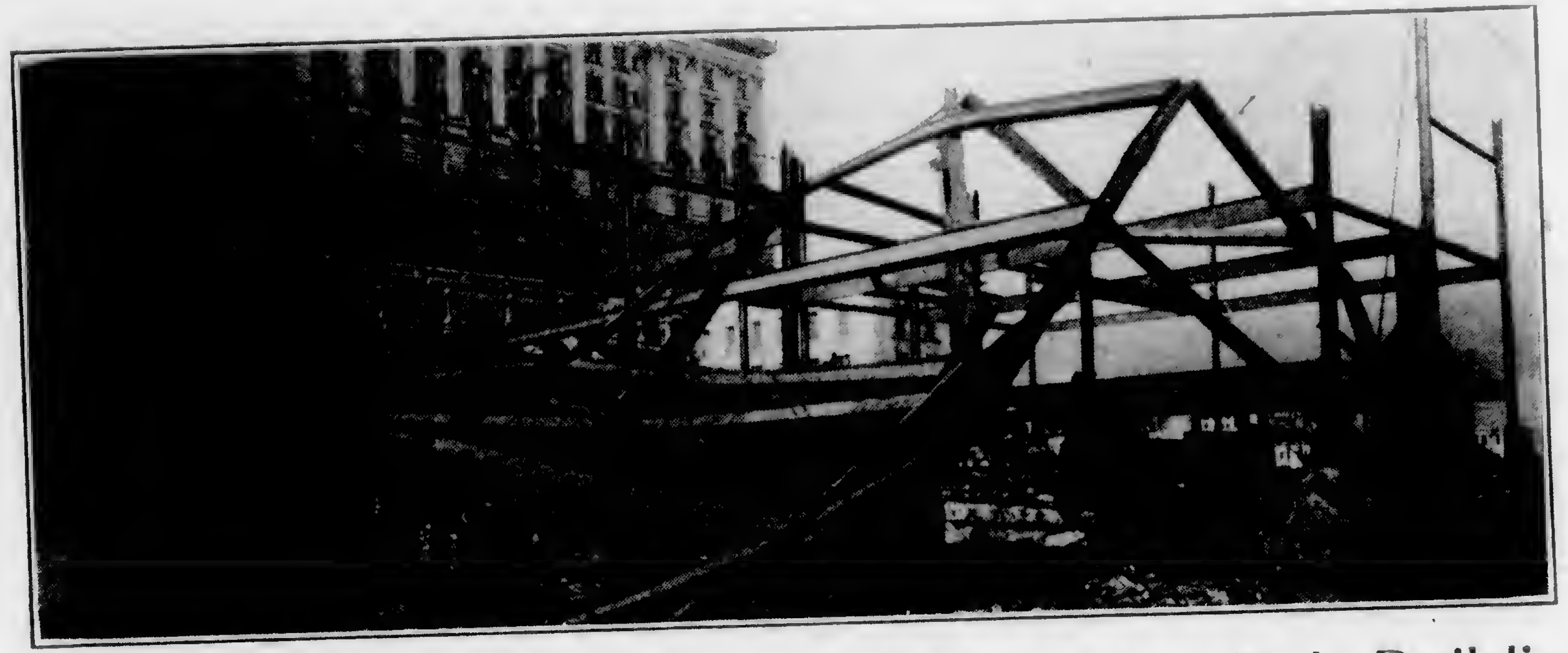
Setting time: Gilmore's needle. Initial set, 3 hrs. 45 min.; final set, 9 hrs. 15 min.; per cent. of water, 20; temperature of air, 70 degrees Fahr.; temperature of water, 70 degrees Fahr.

Accelerated test: Steam test, good; boiling water test, good; specific gravity, 3.08.

Tensile strength of standard briquettes (1 square inch section):

No. of Briquette	Composition	Per cent of water	Time			Strength in lbs.	
			In Air	In Water	Total	Briquettes	Average
55,910	Neat	20	24 hrs.		24 hrs.		314
55,920	Neat	20	24 hrs.	6 days	7 days		630
55,925	1-3	8.8	24 hrs.	6 days	7 days		195
55,930						730	
1						780	
2	Neat	20	24 hrs.	27 days	28 days	730	
3						785	
4						760	757
55,935						380	
6	1 Cement					370	
7		8.8	"	"	"	360	
8	3 Sand					390	
9						340	368

The Medusa White Portland cement is particularly available for use, where, as here, white river and beach sands for aggregate are cheap and plentiful. The accompanying illustrations show some recent constructions in which the Medusa White Portland cement has been used or specified.



Collapse of Steel Frame of University Club Building

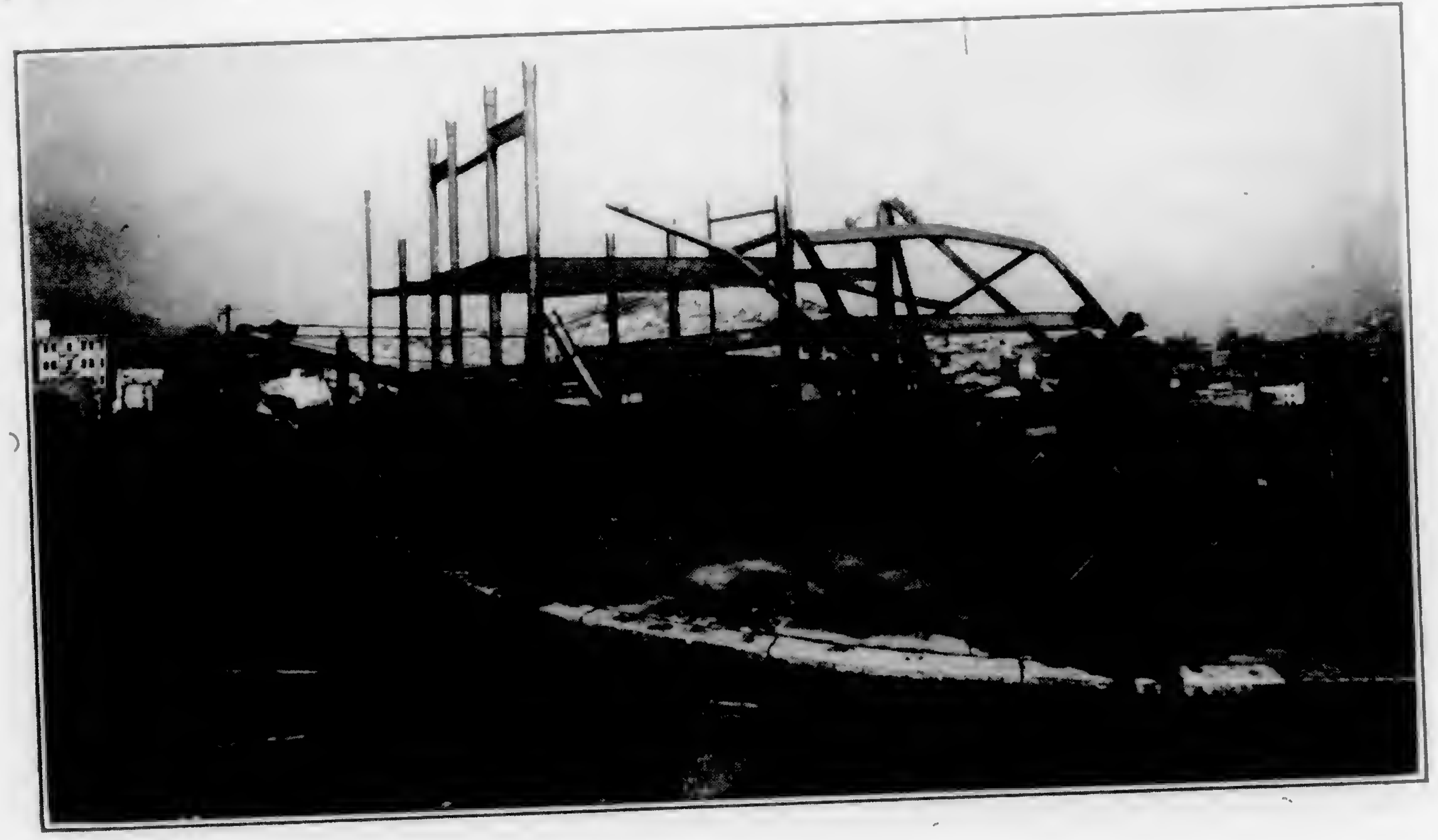
By E. O. RITTER.

THE accompanying illustrations give some idea of an accident which happened recently on the new four-story building being erected for the University Club at the northeast corner of California and Powell streets, San Francisco.

The erection of the steel framework was progressing nicely, the greater part of two stories being already in place. One panel at the extreme south end of the building had been carried up to the roof, but had not yet been connected to the rest of the framework, the girders being left out to allow free use of the derrick, which was used for hoisting the steel.

This panel of the frame was partly held in position by guy ropes, but collapsed early the next morning after it had been erected. The framework fell to the north, where the force of the fall was broken by the heavy girders lodging on the derrick frame, otherwise the entire structure would have tumbled, the force of the fall as it was being sufficient to throw the rest of the framework several inches out of plumb.

The supposition is that the rain during the night caused the guy-ropes to shrink somewhat, and this with the wind that was blowing, together with possible careless bolting of the work during erection, was the cause of the collapse. No lives were lost and no one was injured, probably due to the fact that the workmen had not yet arrived, no one being present but the superintendent of construction.



Among the Architects

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Handsome Bank Building

The new building which is to house the London, Paris National Bank of San Francisco will be a one-story granite structure of imposing exterior, on the lines of modern bank buildings erected in San Francisco recently, covering the site on the northwest corner of Sansome and Sutter streets, 46x123 feet. The design was selected at a recent meeting of the bank directors and is the one submitted by Albert Pissis out of a number of meritorious designs presented by the architects of San Francisco. Next to the Pissis plan, the one drawn by Lansburgh & Joseph was the most favored, and the directors deliberated for some time before they arrived at a choice.

The new building will be devoted to the exclusive use of the bank, and is to be one of the most attractive structures in the commercial center of San Francisco. Its dignified and graceful outlines will give it rank with the finest and best banking buildings in the country and further emphasize the confidence bankers repose in the future of San Francisco as a banking center of first importance.

The interior of the banking room combines the best features culled from the leading banking houses of the world, and is designed to accommodate the growing business of that bank.

Two Competitions for Club Buildings

The Olympic Club and the Bohemian Club of San Francisco are each holding a competition for building designs to cost in the neighborhood of $300,000. The Bohemian competition is confined to architect members of the club, of which there are about sixteen. The proposed building will be three stories and class C. The drawings are to be finished by January 1st, and a selection will be made by the committee soon after that date. Hon. Jas. D. Phelan is chairman of the building committee, and John Layton is the secretary of the club. The prizes offered for the best plans are $750.00 for the first, $500.00 for the second and $250.00 for the third. The first floor of the building will contain the club rooms, billiard and card rooms and dining room. The upper floors are divided into sleeping rooms. There will be a jinks building separate from the main structure. This will contain a large stage and seats for 500 or more persons. This last named building will be of class A construction and fireproof.

The Portland Architectural Club and Their Next Exhibit

While the exhibit will not be held for two or three months, there is much activity among the members in preparing for it, going over and deciding on plans for what is to be the greatest effort of the Club as to character and extent of exhibits—it will be much more elaborate than any former display and will embrace many new features.

In addition to the best work of the members, it is expected to secure for display a large and valuable collection of eastern photographs of subjects of special interest to the profession and will be a valuable attraction.

While a large percentage of the exhibits will probably be contributed by the Portland members, they are endeavoring to interest all architects and engineers in Oregon and the coast cities, with much encouragement.

There is also being considered an auxilliary exhibit of building materials, building methods and appliances. If this is finally decided upon, it will undoubtedly receive prompt attention from material men—and the space for such display will be at a premium.

Altogether, as outlined at this time, the exhibition of the Portland Architectural Club will be an object lesson not only to students of architecture and engineering, but to the public generally.

Architects' Meeting at Los Angeles

The regular monthly meeting of Southern California Chapter, A. I. A., took place in November. The principal business disposed of was the selection of delegates to the annual meeting of the American Institute, held in Washington, D. C., December 15, 16, 17. The delegates who attended were Architects Octavius Morgan, Fernand Parmentier, Myron Hunt and Alfred F. Rosenheim. The alternates were Architects John C. Austin, Arthur B. Benton, John P. Krempel and Theo. A. Eisen.

Architect Robert D. Farquhar exhibited a collection of drawings representative of his work during his studies at the Ecole des Beaux Arts, France. Other drawings representative of student work as taught in Harvard University were also exhibited.

Chief Inspector of Buildings J. J. Backus was present and gave an interesting account of his travels during his recent visit to the principal eastern cities in search of pointers for future guidance.

An invitation was extended to the Chapter by Architect A. B. Benton to visit the new Y. M. C. A. building. Other invitations are pending, one of which by Architect A. F. Rosenheim, is to the new Second Church of Christ, Scientist, as soon as circumstances will permit.

Portland Architects Move

Travis & Wilson, architects, who have for several years occupied rooms in the Lumber Exchange buildings, have moved to new quarters in the Sherlock building, and now occupy Suite 555 and 556, which provide convenient drafting rooms and private offices.

George Rae, the well known construction engineer, is now connected with the firm and has an office in the same suite.

Personal

Architect W. C. Knighton, of Portland, met with a very serious accident a short time ago, but is now so far recovered as to be able to be in his office in the Commercial Club building a part of the time.

The Electrical Club

The Electrical Club of San Francisco is the name of a new organization started for the purpose of bringing into closer touch with each other those engaged in electrical contracting, engineering, jobbing and manufacturing. The club was first started by six energetic "boosters" some weeks ago and now has over forty on its membership roll.

It is the intention of the club to rent comfortable quarters where the members can meet and discuss new and old topics of interest. A minstrel show and burlesque will be given in a few weeks and the electrical effects will be the finest ever seen on any stage in San Francisco.

The club at present is holding its weekly meetings at the Bismarck Cafe on Saturdays, luncheon being served at 1 p. m. in the banquet room. During the meal papers are read and important topics discussed, the afternoon ending with music in the beef steak garret.

Good English

A French lady living in America engaged a carpenter to do some work for her at a stipulated price. She was surprised later to find that he charged more than the price agreed upon. When she attempted to remonstrate with him, however, her English failed her and she said, "You are dearer to me now than when we were first engaged."—Success.

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HEATING AND LIGHTING

Material Arranged by Carl E. Roesch, Edwin B. Pike and Wm. E. Leland, S. B.

Practical Gas Illumination With Inverted Burners

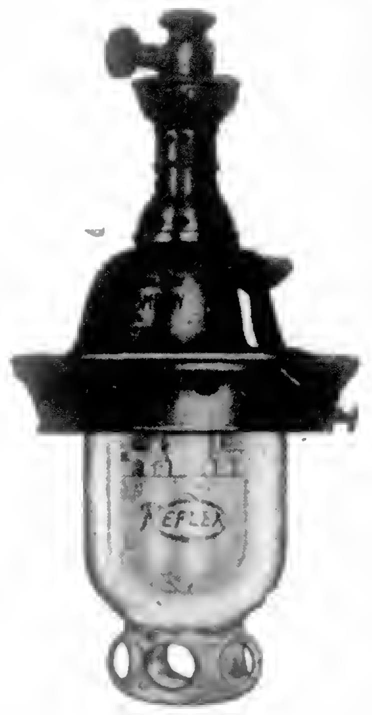

Fig. 1.
Reflex Inverted Gas Lamp

THE inverted type of incandescent gas lamp shown in Fig. 1 marks the latest step in the advancement of gas lighting. . In general, the burner and mantle are in substance the same as the familiar upright mantle burners, adapted, however, to burn in the inverted position. The light from such a combination is wholly unobstructed in the lower hemisphere, and 67 per cent. of its total light is thrown downward without the necessity of reflectors. The upright burners with reflectors distribute 55 per cent. of their total light above the horizontal (1). The great advantage of this one point can be readily appreciated. If reflectors are used they are simply supplemental, as two-thirds of the light is thrown down without them, thereby saving the loss necessary where it is required to reflect all the light. The design of the inverted burner is attractive in appearance, lending itself to all kinds of decorative effects, and it is adjustable to almost every conceivable scheme of illumination.

The lighting element, the mantle, is much shorter than the upright mantle, and its downward end is hemispherical. These features produce more perfect combustion at the mantle surface, increasing its temperature and efficiency. The size and character of the mantle and its mounting give it greater strength and longer life than mantles of the upright type.

The quality of light is exceptionally pleasing to the eye. It is a near approach to daylight, and has been pronounced by many color specialists ideal for truly judging delicate shades and matching colors.

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The extremely high temperature at which the mantle is operated, its greater efficiency, greater downward light, and small radiating surface are factors which materially reduce the heat units per candle-power over other forms of incandescent gas lights.

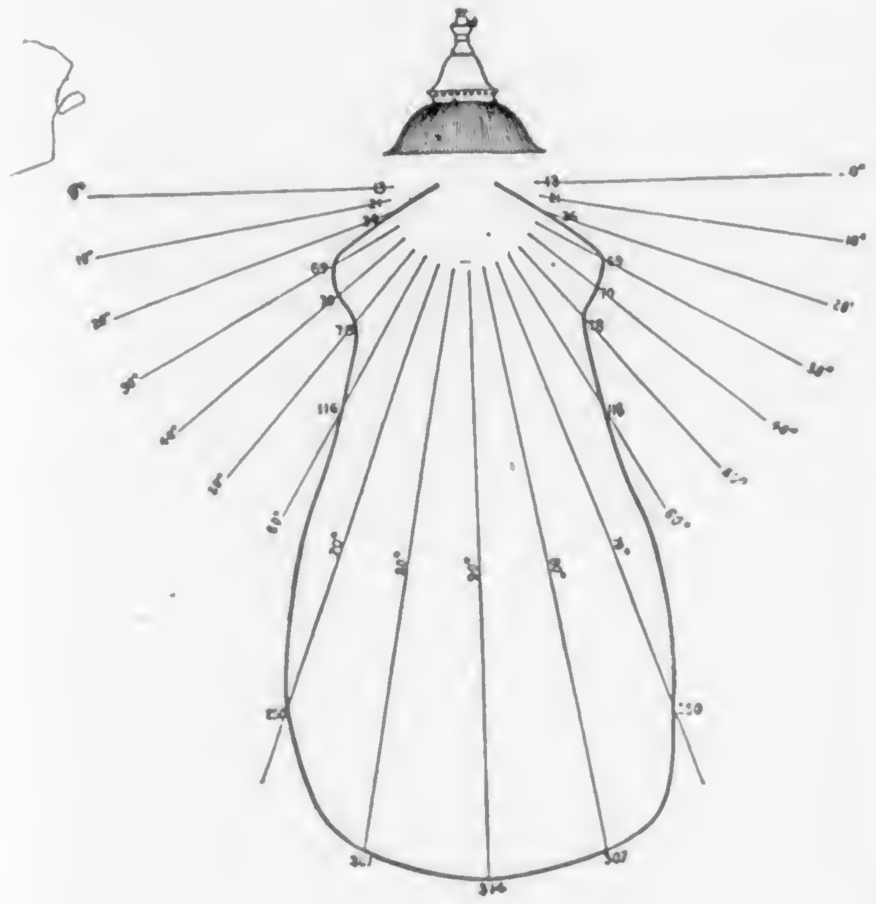

Fig. 2.
Concentrating Reflector.
Reflex Inverted Gas Lamp. Candle Power Curves

By using a small amount of the total light and distributing it above the horizontal for producing color and decorative effects, there is still left a large volume of natural downward light, unaffected for its real work, i. e., illumination. Reflectors and globes of all styles and for all requirements can be had which will produce a soft, diffused, pleasing and mellow light, or an intense searchlight effect, as the case requires.

There is but one size of the inverted lamp as illustrated, i. e., 75 candle-power (2), which is the maximum light ob-

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tained in one direction, the vertical. This is without the aid of reflectors, and shows well the peculiar advantage which the lamp has in its natural downward distribution. The distribution of the natural light between horizontal and vertical is exceptionally good, being 50 candle-power on the horizontal.

This light consumes three feet of gas or less, giving an efficiency of 25 candles per cubic foot. The life of Reflex mantles is not guaranteed, as they may be easily broken by mechanical injury, but from experience in maintaining these lights it is known that 600 hours' burning is a fair average, in which time the candle-power will not drop over 20 per cent. Unlike electric filaments, mantles never burn out. Mechanical breakage usually determines their life, although it is generally economical to renew unbroken mantles after about 800 hours' burning. After this time the decreased efficiency makes it more expensive to operate the old than to buy a new mantle, when it is considered that illumination, and not gas, is the product paid for.

In Fig. 2 a Reflex light is illustrated with a concentrating Holophane reflector, No. 6333. The large volume of light possible to be obtained from a single unit of this kind is plainly shown by the curve—314 c. p. in the vertical direction.

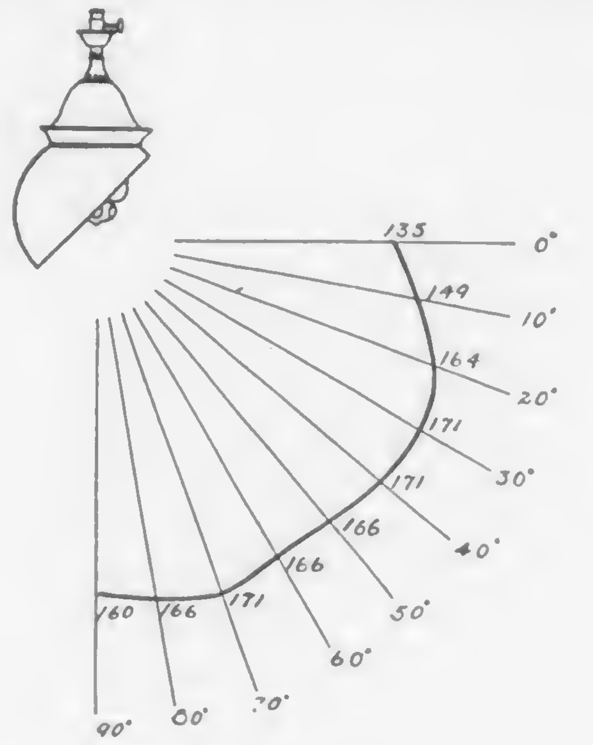

Fig. 3.
Angle Reflector
Reflex Inverted Gas Lamp. Candle Power Curves

In window lighting, by spacing the lights near together, a remarkable volume of white light is thrown on the goods, showing them off in their true qualities and colors. For this class of work this combination is ideal, and, by the aid of the numerous devices recently perfected, it is possible to light the windows by the turn of one key placed at any convenient location.

In Fig. 3 is shown a special form of angle reflector, designed to throw most of the light forward and downward, producing an almost uniform candle-power curve of evenly distributed light. It is particularly adapted for certain forms of window lighting, for bowling-alleys, show-windows, etc., or any place where the eye should be shielded and the light thrown in one general direction.

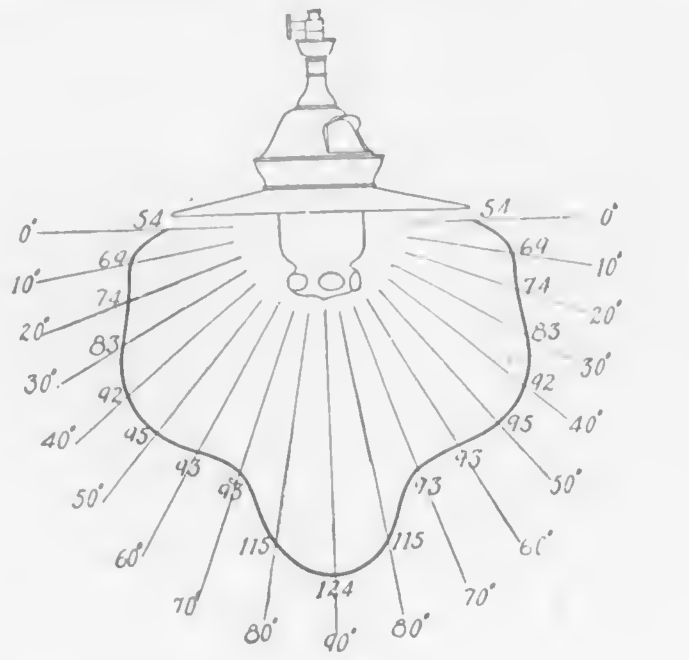

Fig. 4.
Flat Shade
Reflex Inverted Gas Lamp. Candle Power Curves

Fig. 4 shows the Reflex light with No. 503 opal shade. This gives a general distribution of light with the maximum still in the vertical direction.

The proper way of rating illuminants is a question not finally settled. It will be noted that in all commercial figures lamps are rated on the maximum candle-power in some given direction. The standard for scientific rating is the mean spherical candle-power, i. e., the total flux of light measured all over the surface of a sphere of given diameter with the light source in its center. This is not regarded as the correct principle for commercial rating, as it does not give an idea of the value of a lamp for practical illumination, and furthermore, such a rating is wrong, generally speaking, because a light source may be of high spherical candle-power, yet when equipped with accessories to direct the light

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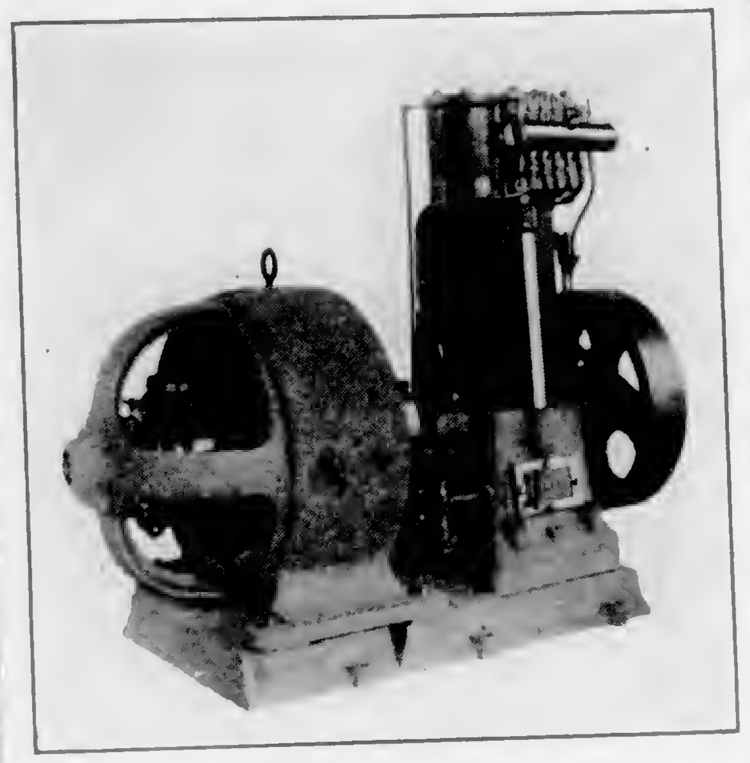

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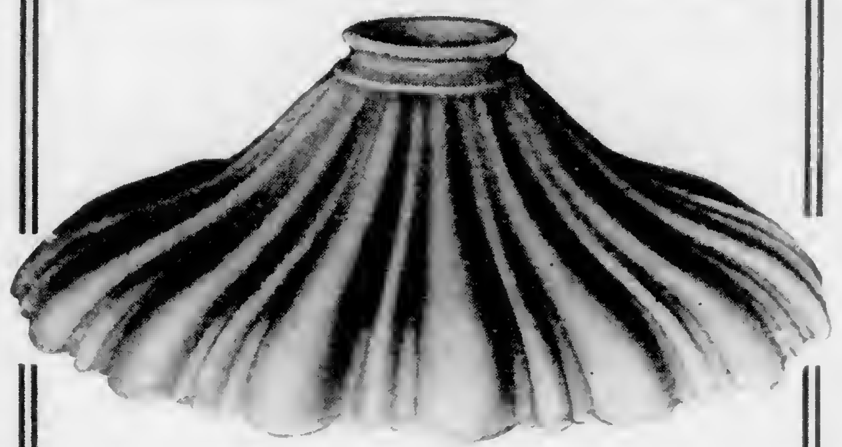

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where needed it is much lower in efficiency than a lamp which may give, by virtue of its design and construction, a better distribution. For this reason the value of a light should be determined and compared on the basis of mean lower hemispherical candle-power.

Hot Water Heating by Forced Circulation

By A. J. Purcell, C. E., Little Rock, Ark.

THIS article is not written with the idea of recording anything new about hot water heating by forced circulation, but simply to give a general idea of the practicable installation of such a system, as the writer is well aware that there are sections of this country where such systems are not in use, and in fact but little heard of by the trade in general, and therefore might be of some interest to the curious ones.

I will therefore try to describe this system as it is installed in the new City Hall of Little Rock, Ark. The source of heat is derived from the District Heating Company's main, laid in the street at the rear of the building. This system is the so-called Schott system, and the lay-out of this building was prepared by W. H. Schott.

To heat this building 10,465 square feet of radiation was installed and the main lines consisted of a 3-inch supply and return, which make a complete circuit of the basement, and of full size the entire length of the circuit. This circuit is so installed that the water, after passing from the supply main and through a riser and belt line on each floor and the radiator attached, has to travel the same distance for each and every riser or branch taken from the main.

The system is equalized, that is, the first water out of the supply main travels just as far as the last water out of the supply main before it can return into the return main. The water in the two mains are flowing in opposite directions and the last outlet of the supply main is where the first inlet of return main enters.

The largest riser line used in the building was 1½ inch, and it supplied 1500 square feet of radiation. From each riser at and above the floor are the belt lines. Each belt is connected from the supply riser into the return riser. This belt has attached to it an average of 250 square feet and in some cases 300 square feet. The entire belt line is ¾-inch pipe, and cut into this, at the points where the radiator is to be placed and the right distance apart, so that corner angle radiator valves can be connected to the radiator, are ¾x½x¾ tees, and in the belt line between the tees back of the radiator is used a piece of ½-inch pipe. This ½-inch piece forms what is known as the by-pass, and allows a certain amount of the hot supply water to pass on to the next radiator on that belt without having to pass through the radiator in front of it.

Each belt line has a gate valve placed at both the supply and return end close to the riser, so that belt can be cut off entirely from the rest of the system in case of repairs or in event of a break-

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age. Each radiator is also fitted with a Jenkins disc steam radiator valve, so that it may be shut off and detached from the belt line without interfering with the circulation in any of the other radiators on the same belt.

The first thought that comes to the reader who is not familiar with this system is, pretty small piping for so large an amount of radiation, but that is easily accounted for, as I will explain later; also the fact that there is no attention paid to grading of the pipe lines, that is, to give them a specified pitch. The entire main in this building is hung on a true level from one end to the other, and so are the branches and belt lines.

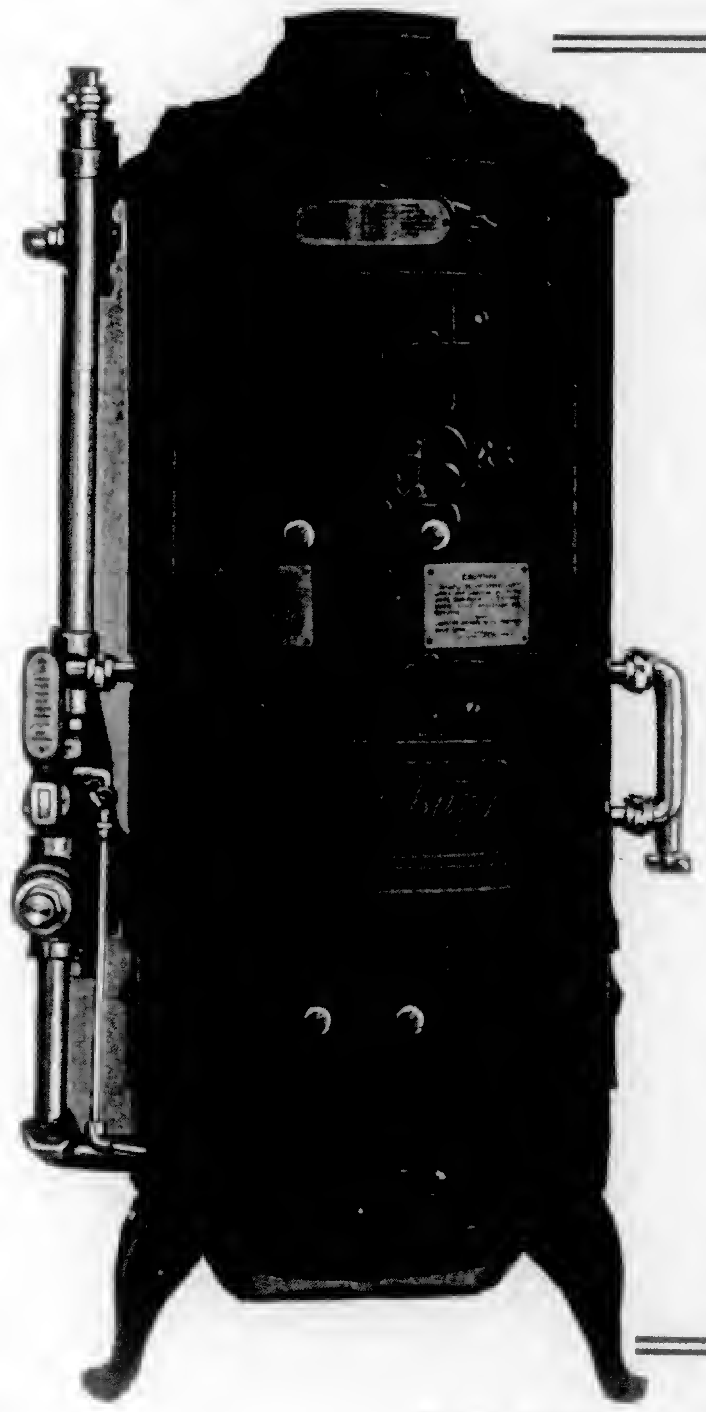
All branches feeding the risers to second and third floor are taken off the top of the main at a 45-degree angle and the return enters at the side. All branches to the basement radiators are taken straight out of the side of supply main and enter the return main at the bottom on a 45-degree angle. This prevents air binding, which is the only thing one must be on the lookout for when installing this kind of a system.

The reason for all this is the fact that the water is caused to circulate through the piping by the circulating pumps at the central station, and that a pressure of 40 pounds is maintained on the entire system during coldest weather by a small pump set close to the circulating pumps at the "station," so that the temperature may be raised from 120 degrees to 220 degrees if desired.

Regular cast iron radiation is used of the Rococo pattern, screwed nipple being the best to use on account of the pressure being liable to cause the push nipple to leak at times. The tappings at the main in the street to supply the large amount of radiation through this 3-inch pipe were only 3¼-inch taps, and the same for the return.

A thermostatic regulating valve is placed on the main return just inside the basement wall. This keeps the temperature of the water from going above the point the thermostat is set for, and prevents this particular building from robbing the street main of more than its share of hot water.

This system, like all others, has its good and bad features. It does away with attendance and the cost of handling ashes and coal and general maintenance and the cost of first installation is considerably smaller than with an independent plant of one's own, as the largest main pipe need not be over 1½-inch in the ordinary dwelling house. On the other hand, one can get heat only when the central station is running, and that is a stated time or season. If chilly weather or unseasonable weather comes outside the limited time, one has to grin and bear it. If the street main breaks, no heat can be furnished before the main is repaired, and if anyone plans to install his own plant after having tried the district system awhile he will find that he must change the whole piping system, as the piping will not be large enough for a gravity hot water job.



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However, Little Rock has a large number of buildings that are heated from the central heating plant, both residences and business buildings. The largest building in the state, a ten-story office building, was heated successfully with it the past winter. This called for a higher pressure on the system than is usually put on one, and it is an open question if there won't be trouble on account of breakage after a few years' use.

Estimating Air Space for Heating

THE problem of warm air furnace heating and ventilating is a fascinating study, and the more we indulge in this study the more interesting it becomes, says the Journal of Modern Construction.

The basic or underlying principle that governs the experienced furnace man is a strict adherence to the rules entering into the problem, and if his conclusions are reached by those rules on a logical basis, instead of the use of "thumb rules," failure and condemnation will be replaced by success and commendation, and the agreeable outcome of success and commendation is increased business and larger profits.

One of the first rules a furnaceman should learn is that of determining the amount of cubic feet of air space to be heated, and in this calculation it is necessary to take into consideration the relation of exposed walls and exposed glass surface to the room or building to be heated. Some consideration, too, must be given to the relation of an adjoining unoccupied property, the loss of heat by transmission in this party wall must be overcome by a proportionate allowance in the total equivalent cubic feet or in the capacity of the furnace, for extra firing when that feature becomes necessary.

A simple rule for determining the equivalent cubic feet is, to the cubic feet in each room add for wall and glass exposure as follows (one-tenth of each square foot of wall exposure being equal in cooling effect to seventy-five cubic feet, and one square foot of glass exposure being equal in cooling effect to seventy-five cubic feet):

First, obtain the cubic feet by multiplying the length by the width of the room and by multiplying this result by the clear height of the ceiling.

Then multiply ten per cent. of the net wall exposure by seventy-five, and add this amount to the total cubic feet.

Then multiply the glass exposure by seventy-five and add this amount to the total cubic feet, and the cubic feet, the multiplied ten per cent. of the net wall exposure, and the multiplied glass exposure will constitute what may be called equivalent cubic feet; that is to say, the total will be equal to the cubic feet to be considered in determining the size of the furnace, the size of the warm air pipes and the size of the registers that will be required to heat the house.

"Watered Labor"

DURING the past campaign a great deal was said about "watered capital." Nobody, however, developed the courage to talk about "watered labor."

When a plant worth $100,000 is capitalized for $1,000,000, it is correct to say that $900,000 of that capitalization is water. The stock market will attend to squeezing out the water, that being one of its most valuable functions, and if the plant is well run and improved out of earnings, the water can be replaced by tangible capital, as for instance it has been largely in the case of the United States Steel corporation. If in the erection of that $100,000 plant a labor union exacts by combination $3.50 a day for unskilled labor worth $1.50, the remaining $2 is water. Every cent paid to a working man above the value of the wealth he creates is water. He is, in fact, doing the very thing on which is based the chief complaint against capital.

* * *

Not much more than a year ago organized labor did not allow a bricklayer to lay more than 700 bricks a day. A very good man can lay 1,800. There are more bricklayers than jobs for them now, and the same bricklayer today who was laying 700 bricks is now probably laying 1,400. The difference between the 700 and the 1.400 bricks is water. It is a charge made for wealth not created. Bad work, cheap work, lazy work, unconscientious work, wilfully slow work, all of them constitute water upon which the rest of us work to pay dividends. This applies not merely to organized labor, but to all workers, professional, business and others who demand and receive more than they earn.

* * *

Nothing is really more injurious to the workman than what is called "Ca'canny." It is the embodiment of the fallacy that the workman benefits by doing as little work as possible, and thereby forcing the employment of more hands. Everybody is injured by that practice, and nobody more than the workman himself. The fact can be stated with mathematical precision. If fifty workmen are employed on a job which really only requires twenty-five, the extra twenty-five are consuming wealth which otherwise could be used to employ more labor. If on the other hand twenty-five men are employed on the job and give their best efforts, thereby producing more than they consume, they are creating wealth, which must be employed in other labor, and will ultimately employ far more than the unnecessary twenty-five who were "soldiering" on the original job.

—Wall Street Journal.

By the Way

Some Industrial Information Worth the While

Nice Contract for Hoyt Bros.

Hoyt Bros., the well known contractors of Santa Rosa, have recently been awarded the contract for the construction of the new Santa Rosa postoffice building. Their bid was $55,750. The building is to be a handsome structure of white brick, with stone trimmings and columns.

The same firm were the contractors of the White House in Santa Rosa, which was designed by Architects Stone & Smith, and which building is illustrated in this number of the Architect and Engineer.

An Excellent Waterproofing Stain

The Whittier Coburn Company of San Francisco and Los Angeles have been made the Pacific Coast agents of the Parker-Preston Company of Norwich, Conn., manufacturers of a waterproof staining for shingles. A preparation is also manufactured by the Parker-Preston Company for waterproofing flat bricks, and for exterior and interior treatment of brick, stucco, cement, natural and manufactured stone surface. It can also be used on exterior woodwork. It is an elastic coating that does not become hard and scale off as in the case with paint made from lead and oil or other combinations.

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Cordes Building—A. L. Worswick, Architect

The Cordes Building at Washington and Drumm streets is faced with **"GOLDEN GATE SANDSTONE"** brick a white pressed brick made of sand and lime (no cement). Fire cannot hurt them (see east wall Monadnock Building). We have sold the Southern Pacific R. R. Co. **GOLDEN GATE SANDSTONE BRICK** to face three different buildings. Phone or write for samples and prices. **GOLDEN GATE BRICK CO.,** C. F. Pratt, Manager, Main Office **660 Market Street, San Francisco.** Factory, **Antioch.**

N. Clark & Son Busy

N. Clark & Son have received a contract for supplying all the brick and terra cotta for the new Exeter hotel to be erected at Ellis and Powell streets, San Francisco, from plans by Stone & Smith. The brick is to be a handsome light grey. The same firm is supplying the cream colored brick for the new Richmond high school, from plans also by Stone & Smith. The Mission roof tile on the Zimmer apartment house, San Francisco, was made by N. Clark & Son and the same firm has recently closed a contract for the glazed terra cotta for the Peterson building on Market street, from plans by T. Paterson Ross and A. W. Burgren. The same firm furnished the tile on the new Maskey building and the Holmes Investment Company's building. An addition has recently been built to the Clark works in Alameda which will increase the company's facilities for turning out terra cotta.

Does Good Work

Chas. S. Amsler, whose sheet metal works are at 25 Shotwell street, San Francisco, will do all the sheet metal work on the new Exeter hotel at Ellis and Powell streets, San Francisco. Mr. Ansler has lately completed a very nice job of sheet metal work on the Fuller warehouse, also the cornice work on the Bank of Populare building, and a contract is being wound up for the installation of automatic elevator trap doors in the Otis building at Davis and Pacific streets, San Francisco, Wright, Rushforth & Cahill, architects.

Hardwood Panels

One of the most readable pamphlets that has reached the Architect and Engineer in the past few months is the illustrated catalog that is being distributed by the firm of E. A. Howard & Co., manufacturers of hardwood panels.

The Howard Company, in their catalog, have set forth both in cleancut phrases and in photogravure reproductions of samples of the various woods, the beauty, as well as the utility of hardwood paneling, in specimens of the wood and in pictures of interiors treated by the new method.

We advise as many of our readers as are interested in interior decorative work to send for a copy of this catalog.

The Best Patent Chimney

Dunlevy & Gettle report a good demand for Dunlevy's patent chimneys, which architects have found to be an improvement over all other chimneys heretofore placed on the market. This firm has one of the best equipped plants for turning out terra cotta chimney pipe and flue lining in San Francisco, and since the fire its business has increased tenfold. Some of the work recently completed by them includes the Chronicle building, La Hacienda apartments, A. J. Falk's flats, etc. The Dunlevy patent chimney is recommended by the San Francisco Board of Public Works and the Fire Underwriters.

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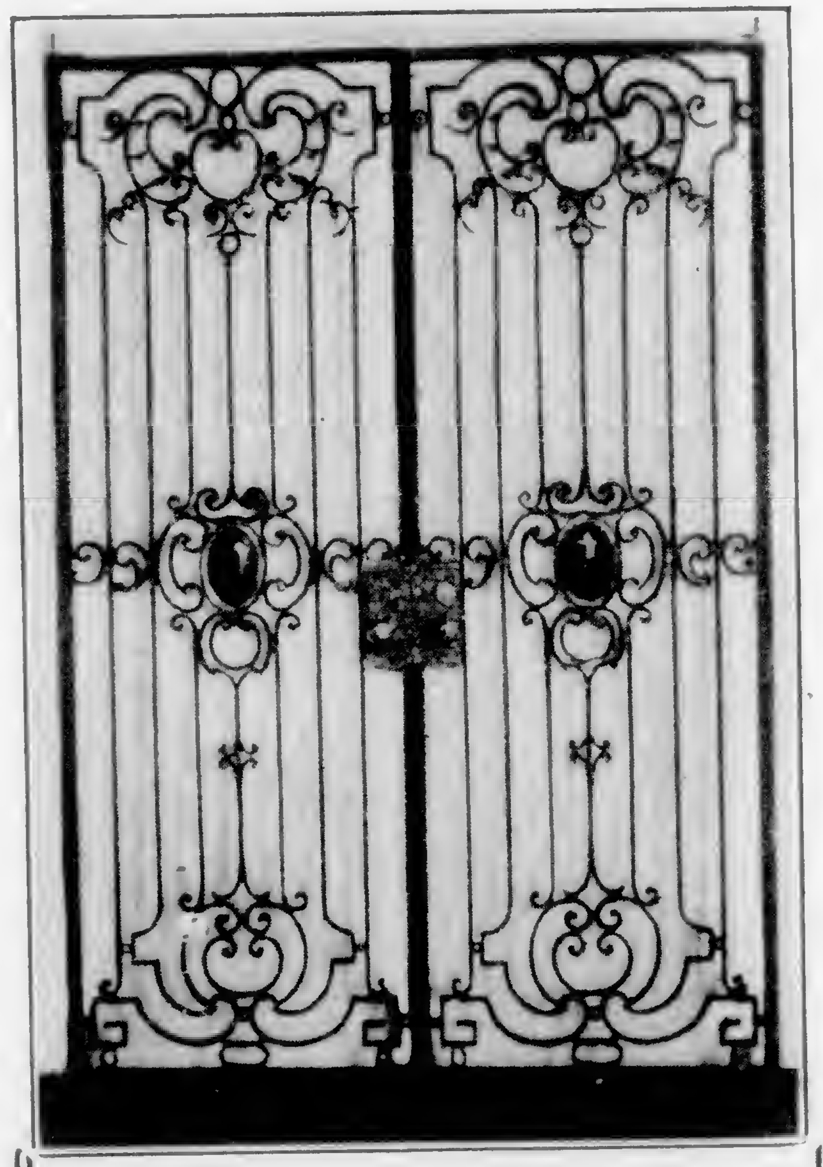

Wrought Iron Entrance Gates to Brandenstein Residence, San Francisco, Cal., Herman Barth, Architect

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Vacuum Cleaning

With education and a better idea of modern sanitary conditions, house cleaning means something more than the mere "stirring up" of dust in a room with a broom or the "dusting" afterwards with a feather duster or cloth. This method simply dislodges the dust, permitting it to settle again and leaving a condition no better than at the outset.

Today to properly clean a room we must remove the dust and dirt, and this removal should be accomplished with as little disturbance as possible.

The vacuum cleaner solves the problem of sanitary cleaning of rooms, large or small, together with their contents. Not only does this method clean and sweep, but by its use we may scrub as well.

It is interesting to note the different forms to which the vacuum system can be applied, and this can be readily seen by reference to the illustrated catalogue issued by the Vacuum Engineering Co., of 114 Liberty street, New York, and Monadnock Building, San Francisco.

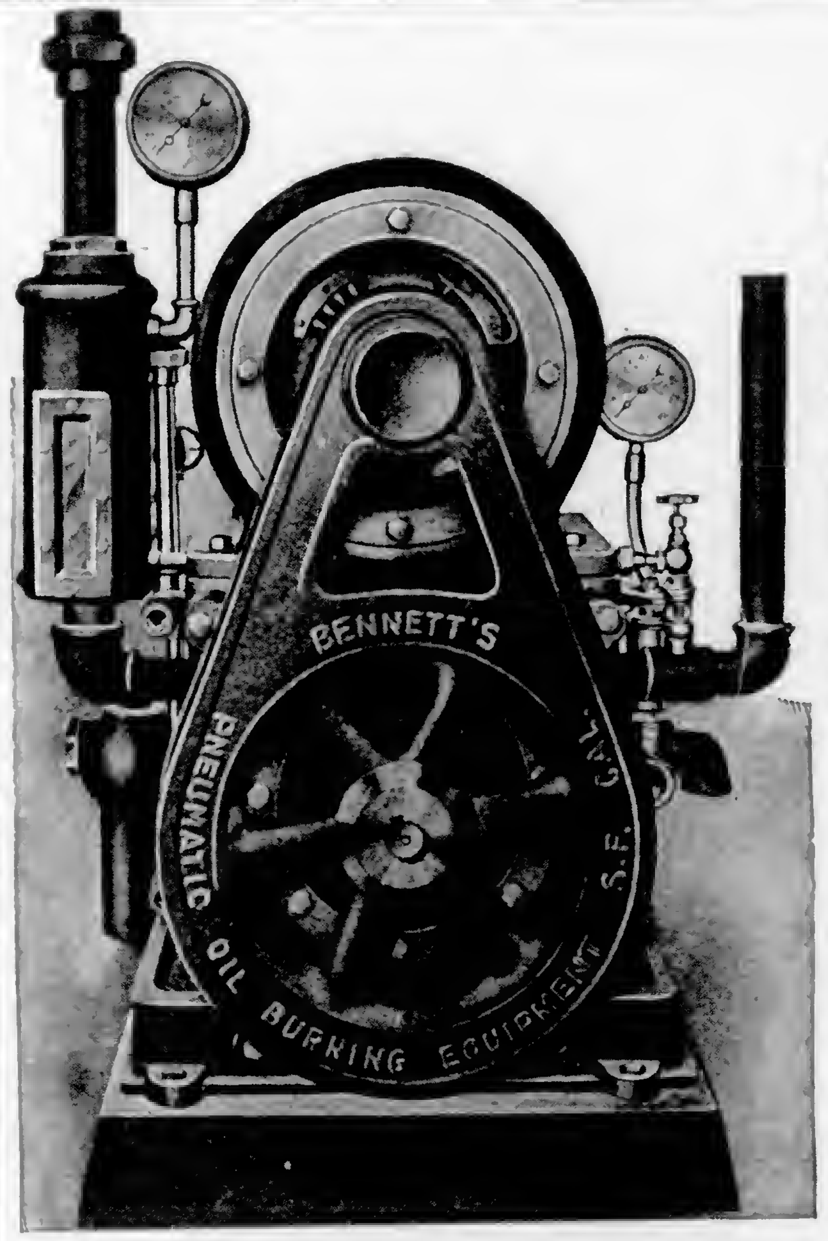
The machinery made by this company embraces every form of vacuum plant from the simplest type to the largest machines made for this purpose, and the many new and specially constructed improvements introduced will, we believe, warrant the architect and builder in investigating the product of these manufacturers.

A New Kind of Drawer Slide

A new kind of drawer slide which is a great improvement over any drawer slide heretofore invented, is being placed on the market by the Reliance Ball Bearing Door Hanger Company of 1 Madison avenue, New York.

This slide embodies the same mechanical features that made the Reliance ball bearing door hanger famous. It consists of four grooved steel bars, two of which remain stationary, while the other two move between them on steel balls fitted into the grooves. The device is strong, remarkably easy to operate and so simple it cannot get out of order. It is attached to the bottom of the drawer in such a manner as to take up very little room (can be attached to drawers not made especially for it), allows the drawer to be opened fully four-fifths of its length, and will not permit the drawer to pinch or bind at any point. It works so easily that a slight push, applied at any point on the front end of the drawer will close it.

Some of its advantages are that it takes up very little room, is out of sight, and is probably the strongest ball bearing drawer slide that could be devised. Its principles are not new, but they have been applied after very careful study to do away with defects common in other drawer slides.



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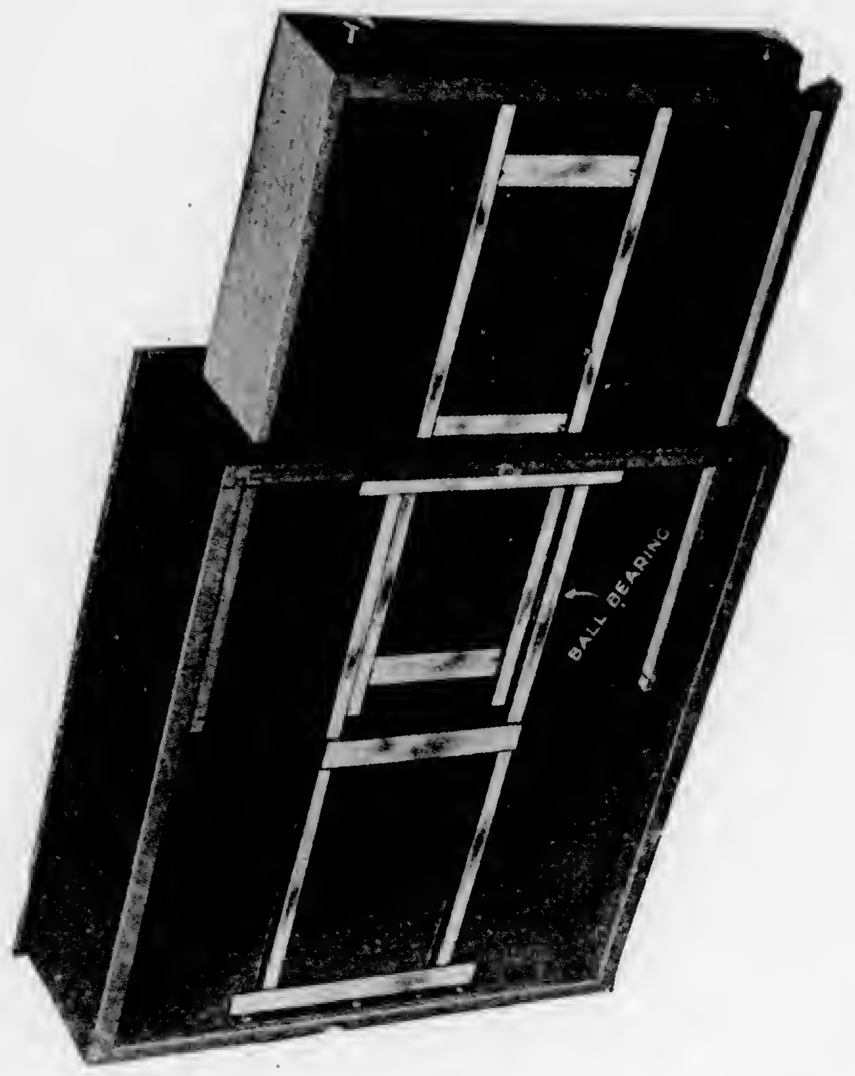


Although the slide has been on the market a very short time it is awakening the interest of a great many architects and contractors who make a specialty of the kind of work in which this device can be so advantageously used, namely, bank and office furniture and fittings, store and merchandise show rooms and fine cabinet work, where a great number of easy running and durable drawer slides are required.

This slide grew out of the remarkable success which the Reliance door hangers have had, and its construction was developed from principles incorporated in the door hangers, and on which the Reliance Company is fully protected by patent rights.

The Reliance Company is represented in the Coast cities, and information concerning this slide can be obtained from the following agents: D. E. Fryer & Co., Seattle, Wash.; Louis R. Bedell, Los Angeles; Portland Wire & Iron Works, Portland, Ore.

J. P. Kiggins Company Busy

The J. P. Kiggins Company have decided to re-establish a permanent business in Portland, where they have lately been awarded some important contracts.

Their name is very favorably known in Portland from the successful completion of some large jobs in their line, including the Perkins hotel, Cascade hotel, Provofort hotel, Tulle & Gibbs building and Fleidner building.

The Portland branch will not interfere with their business in Vancouver, where they have a splendid patronage.

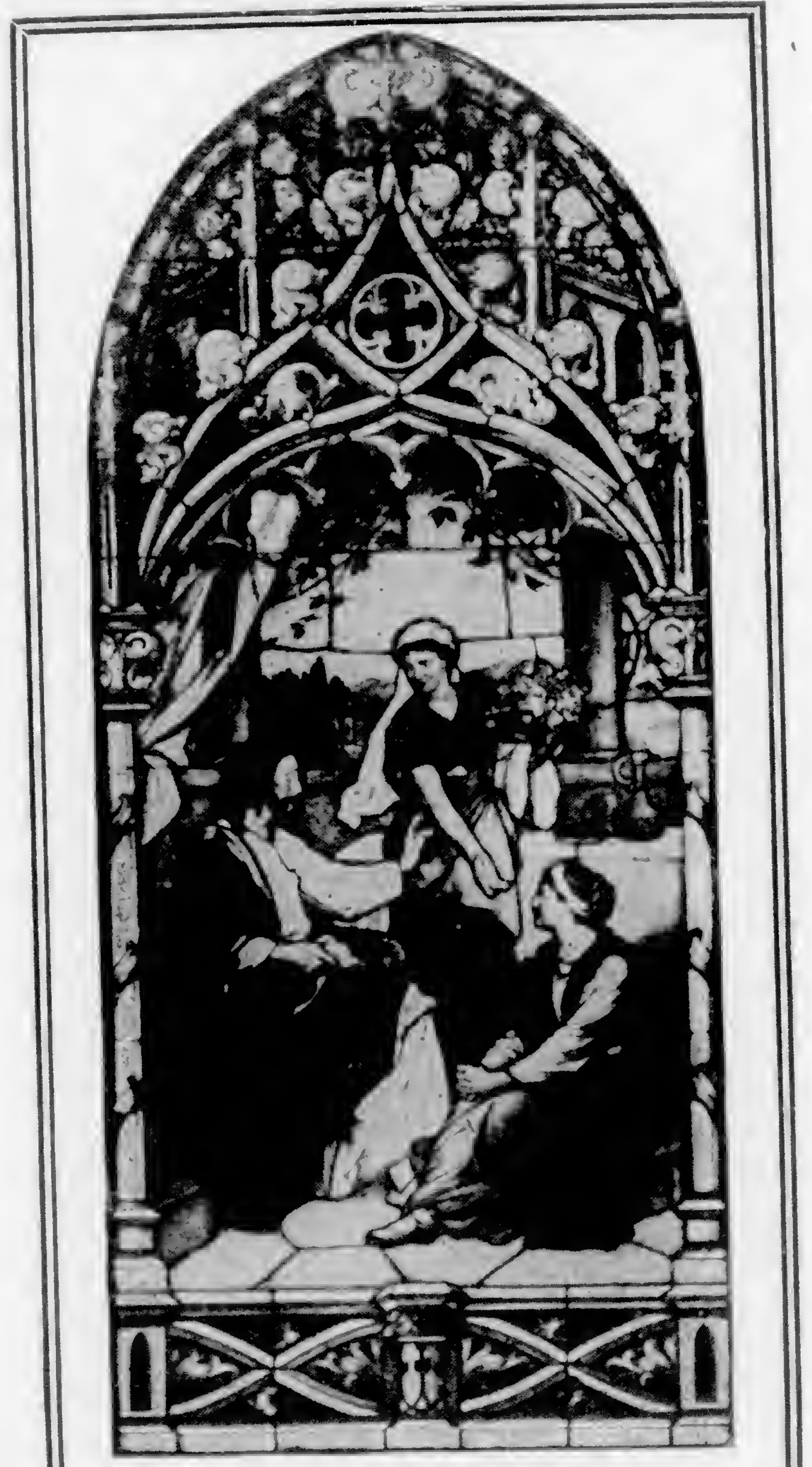
Steel Tanks

The City Iron Works of Portland have lately completed three very large steel tanks for the Weinhard Brewing Company, and have also installed complete fire escape systems on the buildings of the Columbia Milling Company and the Rosenblatt Company.

Agency for Satinette

W. P. Fuller & Company announce that they have secured the agency on the Pacific Coast for Satinette, the white enamel that will not turn yellow, made by Pinchin, Johnson & Co., London, England. This enamel is especially adapted to high grade work.

For hospital operating rooms it is unsurpassed, as it is not affected by acid fumes or antiseptics. It is suited for decorative work of every description inside or outside. Can be washed with hot or cold water.



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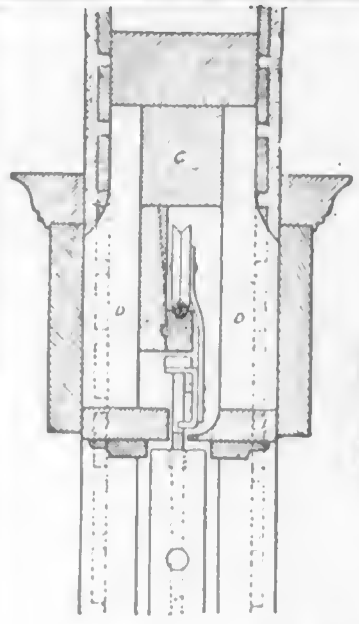

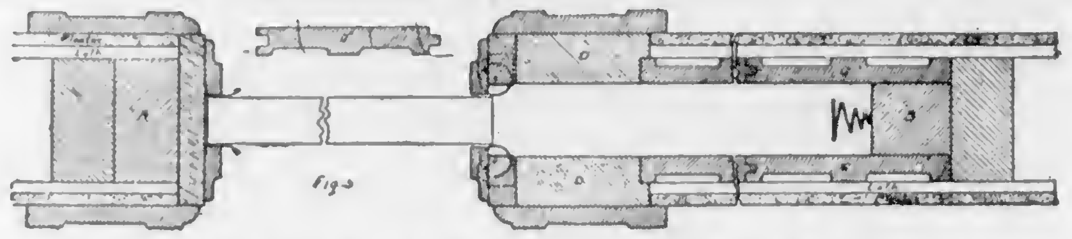

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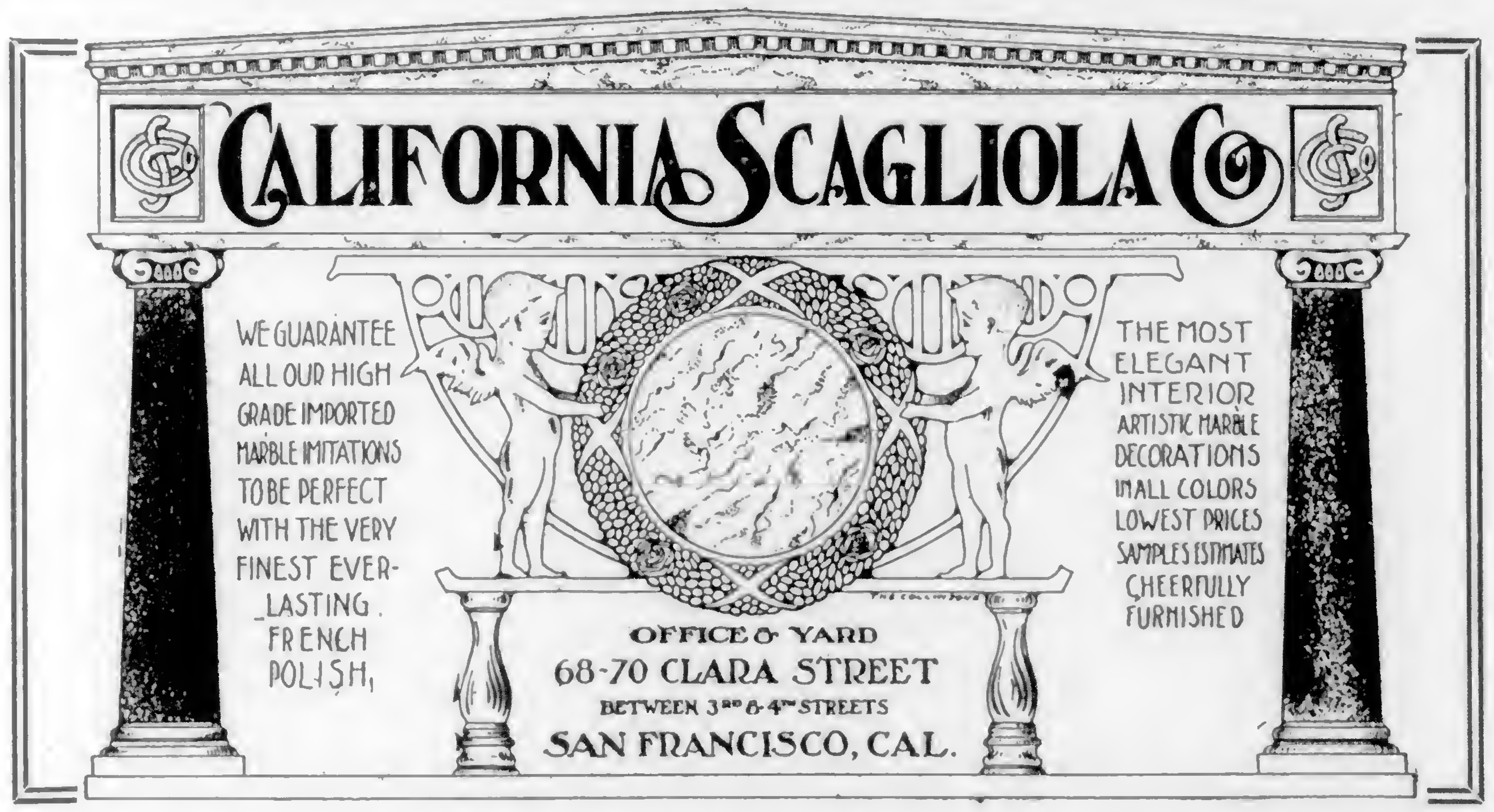

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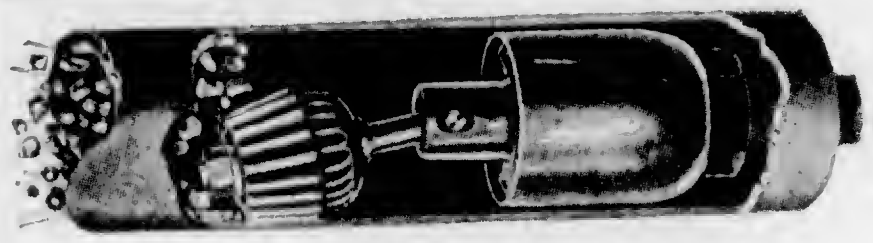

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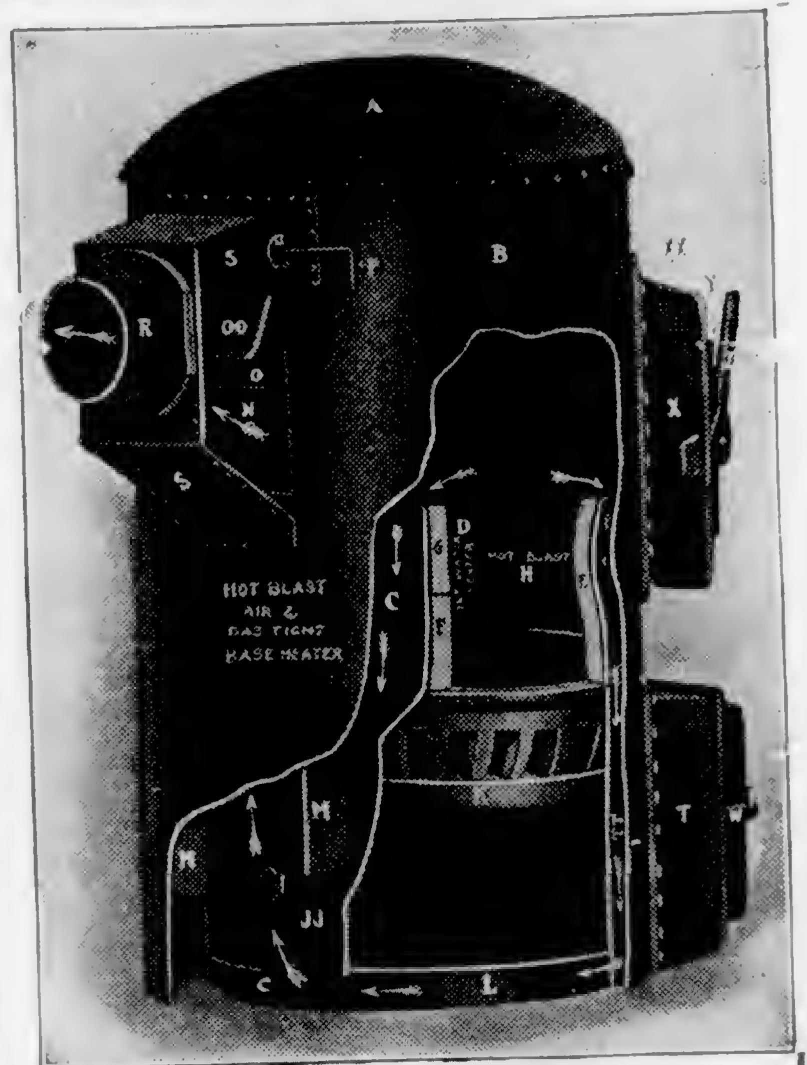

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Important Verdict in a Los Angeles Case

An interesting case was recently decided in Los Angeles when Architects Neher & Skilling were given a verdict by a jury in Judge Monroe's court for services rendered Miss Mira Hershey in the preparation of plans and specifications and for superintendence of several buildings in Los Angeles, Hollywood and Muscatine, Iowa.

In order that the case be more clearly understood it should be stated that there were several amounts or items incorporated in the suit. These were embodied in the judge's instructions to the jury, and in order that each receive attention certain questions thereto were propounded and their answers called for. The items referred to were for (1) sketches for a residence at Hollywood; (2) sketches for a clubhouse at Hollywood; (3) plans, specifications and detailed drawings and supervise construction of a building at Fourth street and Grand avenue; (4) plans, specifications and detailed drawings and supervise construction of a building at Muscatine, Iowa.

Preceding the questions asked, Judge Monroe called attention to the importance of the following law points governing the case, and the bearing that the State law governing the practice of architecture had to cases of this character:

"It is unlawful for any person in this State without a certificate to practice architecture or to advertise or put out any sign or card or other device which might indicate to the public that he is an architect, provided that any person may make plans for his own buildings or furnish plans or other data for buildings for other persons, provided he fully informs the person to whom such plans and data are furnished that he is not a certificated architect.

"Neither you nor I are concerned in the justice or wisdom of that law, but all of us are bound by it.

"Before you can find for the plaintiffs in any amount except for money actually expended by them as alleged in the last cause of action for building permit, amounting to $81, and for money paid out for a steam fitter for the Hershey Arms, amounting to $5, you must believe from the preponderance of the testimony that Mr. Neher fully informed the defendant that he was not a certificated architect, before he or his firm did any work for the defendant.

"It is not enough that the defendant may have been informed of facts which might put her on inquiry as to whether Mr. Neher was a certificated architect or not, or that somebody else other than Mr. Neher may have told her that he had not passed examinations, but she must have been fully informed by Mr.

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Neher that he was not a certificated architect, or there can be no recovery in this case in any event, except for $81 expended for a building permit and $5 for money paid out for a steam fitter.

"Now, if you find by the preponderance of the testimony that the defendant was fully informed that Mr. Neher was not a certificated architect within the instructions just given then and not otherwise you may proceed to consider from the testimony what if any work was done by the plaintiffs, and if there was, what if anything they are entitled to recover therefor, but in no case can they recover anything for supervision upon any work done in California; whereas if any work was done in Muscatine, and they are entitled to recover at all, they may recover for supervision, if it was properly done, as well as for preparing plans and specifications.

"There can be no recovery for voluntary services, but if defendant requested plaintiff to prepare sketches for a residence or clubhouse at Hollywood and such sketches were prepared at her request, they would be entitled to recover, whether she was the sole owner of the property upon which the buildings were to be erected or not.

"It appears in the case that they did prepare such sketches, the value of those for residence being $100 and those of clubhouse $200, but of course there can be no recovery for either of these in any event if full information was not given to defendant that Mr. Neher was not a certificated architect before he was employed."

The following were the questions and the answers given in reply:

Ques. (1). Did the defendant employ plaintiffs to draw sketches for residence at Hollywood? Ans. No.

Q. (3). Did defendant employ plaintiffs to draw sketches for clubhouse at Hollywood? Ans. No.

Q. (5). Did the defendant employ the plaintiffs to draw plans and specifications and detailed drawings for and to supervise construction of building at 4th street and Grand avenue? Ans. Yes.

Q. (6). Did Otto H. Neher at or before the time of said employment and before doing any work fully inform the defendant that he was not a certificated architect? Ans. No.

Q. (7). Was said contract of employment a contract for four per cent on the estimated cost of a building, for plans and specifications and drawings and supervision; or was said contract of employment a separate contract of three per cent on estimated cost of the building for plans, specifications and drawings, and one per cent on said estimated cost of supervising? Ans. Entire.

Q. (8). Did the defendant employ the plaintiffs to draw plans, specifications and detailed drawings for and to supervise the construction of the building at Muscatine, Iowa? Ans. Yes.

Q. (9). Did Otto H. Neher at or before the time of said employment and before any work was done thereunder fully inform the defendant that he was not a certificated architect? Ans. No.

Q. (10). Was said contract of employment a contract of five per cent on estimated cost of building for plans, specifications, drawings and supervision, or was said contract of employment a separate contract for three per cent on estimated cost of building for plans, specifications and drawings and two per cent of said estimated cost for supervision? Ans. Separate.

The verdict given the plaintiff was $2800 for the plans, specifications and drawings for the building in Iowa and $266 for supervising its erection. The estimated cost of the building was $128,000. Of this amount $34,631.59 was done before plaintiffs ceased to be connected with the building.

A total sum of $3152 was awarded, which included $81 advanced for building permit for the Fourth street and Grand avenue building, and $5 for the services of a plumber on the Hershey Arms building.

The court having instructed the jury that payment had been made in full for all services rendered on the Fourth street and Grand avenue building, the jury so decided.

Sound-Proof Partitions

Considerable discussion has been had concerning the sound-proof qualities of partitions in buildings. The San Francisco Fireproofing Company seem to have in the Collins system of metal partition, the most perfect sound-proof partition on the market.

Notice the longitudinal slots in the steel studs. These slots afford an air space throughout the entire partition, so that whatever sound strikes the wall is

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distributed in all directions, and is not confined to any particular section or cell as in hollow tile or other partitions.

The Berkeley Polytechnic School is equipped throughout with hollow partitions (Collins system), and this building is without doubt as near to perfection in sound-proof partitions as is possible to be made. This particular feature alone makes the Collins System especially adaptable for school buildings, hospitals, etc.

A Busy Engineer and Surveyor

One of the busiest engineers and surveyors in San Francisco just now is C. L. McEnerney, with offices on the fourth floor of the Balboa building. Among the engineering problems in which he is engaged is the development of water rights that will provide power for an electric interurban system that is being promoted by Eastern capitalists. Mr. McEnerney is also planning the reclamation of 100,000 acres of tulle land on the Sacramento river. As chief engineer and surveyor for the Mission Promotion Association, he has charge of an extensive scheme which will mean wider streets and better grades in the Mission district. It is also proposed to reclaim and develop the swamp lands in the Islais Creek Basin south of the Potrero.

Circulation of Cooled Drinking Water

An exchange has this paragraph in relation to the circulation of cooled drinking water to rooms in hotels: "The supply of ice cold drinking water to every guest room in the New Southern hotel of Chicago will be done economically by means of continuous circulation of iced water through supply pipes. The water is filtered and cooled, then circulated by means of a rotary pump. The supply pipe runs directly back of the faucets, so that in drawing the water, not a thimbleful is wasted before the coldest water is delivered. The force needed is not great, because the return flow is by gravity."

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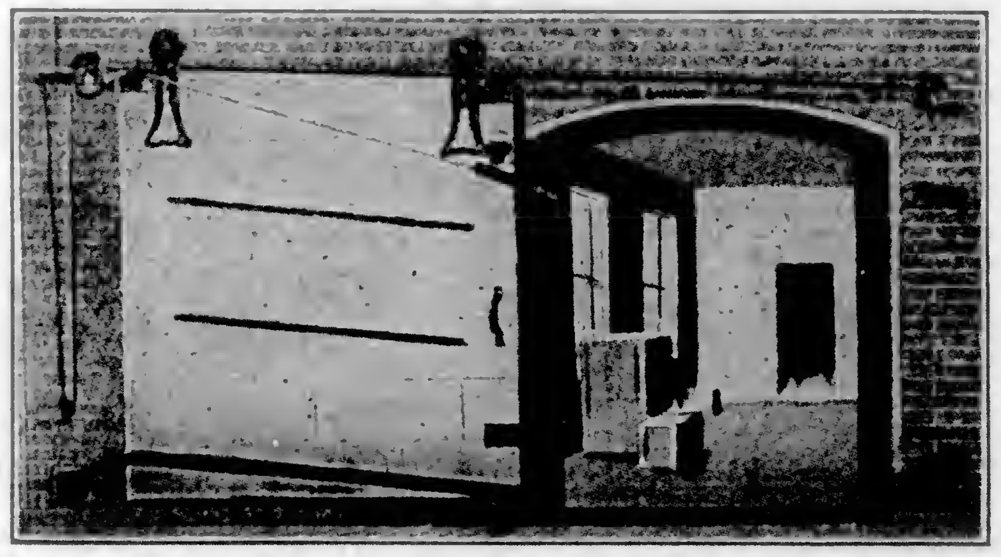

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How Fancy Cabinet Woods are Prepared

J. H. Dieckmann, Jr.

"WE would not make our salt were we to handle our logs that way." Such was the remark of a Portland sawmill operator during a visit to the hardwood sawmill of the Dieckmann Hardwood Company.

No wonder he spoke that way; the slow, tedious process which the logs underwent warranted his remark.

Lumber in Stacks Ready for Dry Kiln

First he observed the logs carefully handled by a derrick from one pile to the skidway of the saw. Later he watched these logs one by one put on the saw carriage. There the sawyer would examine the log carefully, manipulate the lever which controlled the movement of the log carriage back and forth across the fast running band saw; a board would be cut, the log carefully looked over, another cut or perhaps a turn of the log to some other side, and so on by cutting, watching and turning, the piece would be gradually used up. Occasionally a piece having certain qualifications of extra figure, soundness, etc., would be set aside for the veneer saw.

Logs in Yard

This method was so different from that to which our friend had been accustomed.

In the pine districts the logs are put on the saw carriage and rushed through as fast as machinery can take them. It is quantity in a given time that they want, but with mahogany, jenisero or other fancy cabinet and valuable woods the cutting must be slowly and carefully done, as the log can be easily and quickly ruined by carelessness or haste.

After cutting the logs a still longer and more tedious operation must be gone through. The lumber is trimmed, piece by piece, by men who have to handle it carefully. It is then put on trucks and carried out into the open yard where two men pile the boards "on sticks," that is, separating each horizontal tier of boards by a stick an inch square, which must be made of the same kind of wood as that being piled up. These sticks must be placed with the utmost care—one above the other, supporting the load evenly. When these piles are sixteen feet high they are left there for months, or until the moisture of the wood has almost entirely evaporated. Again the lumber is carefully taken down and in like manner piled in a dry kiln, where the drying process is completed and the wood made ready to be put into the cabinet maker's hands. The kiln is a hot chamber where the material must be handled by experienced hands, so it may not be "buckled" or case-hardened, i. e., hardened on the surface and left with considerable moisture on the inside.

Log Going Into the Mill

It does not injure the texture of the wood to air dry it and then to finish the drying with a few days in a well regulated dry kiln with moderate heat; it does injure the wood, however, to take it from the saw and put it in a dry hot

Sawing Logs

kiln, as is sometimes done by unscrupulous manufacturers.

The manufacture of veneers entails still more work, as these delicate sheets, 1/20, 1/16, ⅛ or 3/16 of an inch in thickness are naturally more liable to damage. Imagine a piece of wood so thin that it takes sixteen or even twenty pieces one on top of the other to make an inch thick, and these pieces from ten to twenty-four inches wide and ten to twelve feet long; they naturally require the most careful handling, because they damage easily.

Veneers are cut by a circular saw made in segments, the peripheral cutting edge of which is about one-twentieth of an inch in thickness. Here the log or "cant" as it is called in the mill, is not turned because it comes from the band saw already prepared from selected wood and must be cut in just one way so as to show the best figure possible.

The drying of these veneers is accomplished in the same manner as that of the lumber, except that it requires a very moderate heat, and, of course, less time, owing to the thinness of the wood. Sometimes veneers are left in the air for forty-eight hours, and again other times they are put in the dry kiln only for a few hours, when they are taken out, the pieces carefully numbered from one up in exactly the same manner as they came off the log, then bundled and put away.

Is it a wonder that our Oregon friend should have been positively shocked at the tediousness of the process and the patience required for the preparation of fancy cabinet woods?

The Spencer Turbine Cleaning Apparatus

Henshaw, Bulkley & Company, 19-21 Fremont street, San Francisco, have taken the agency for the Spencer Turbine Cleaner Company's vacuum cleaning apparatus which has been used very extensively in the East and is recommended by many of the leading architects in the country. On the Pacific Coast the Spencer apparatus is used exclusively in the Wright & Callendar building, Los Angeles, and the Whitworth school, Seattle, Wash. Some of the vital points of the Spencer vacuum cleaning apparatus are as follows:

1. Efficient and thorough cleaning.
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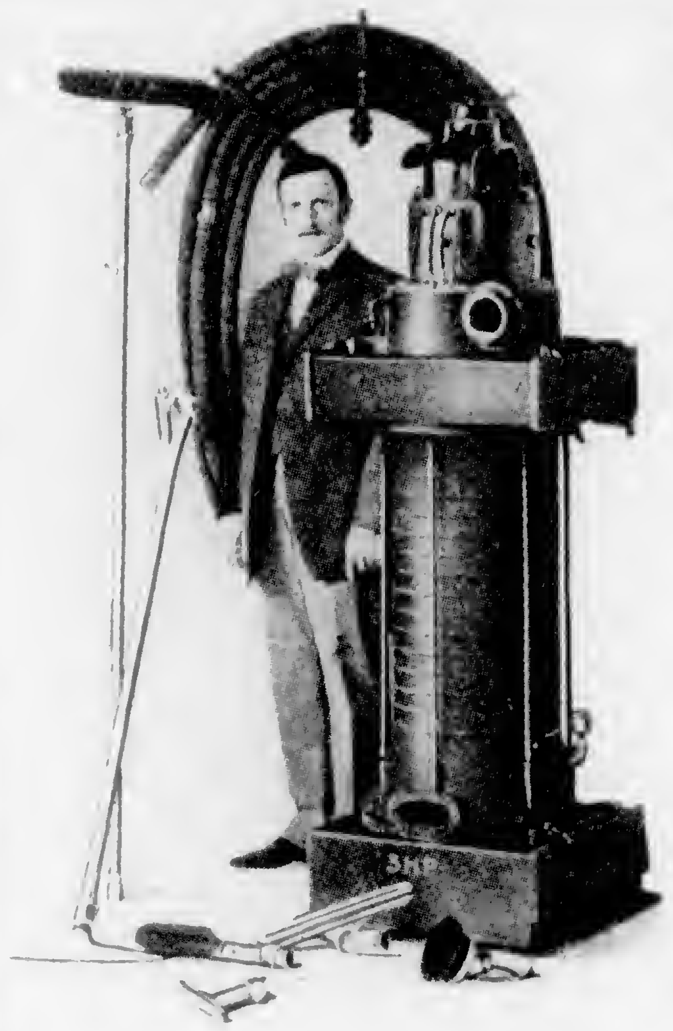

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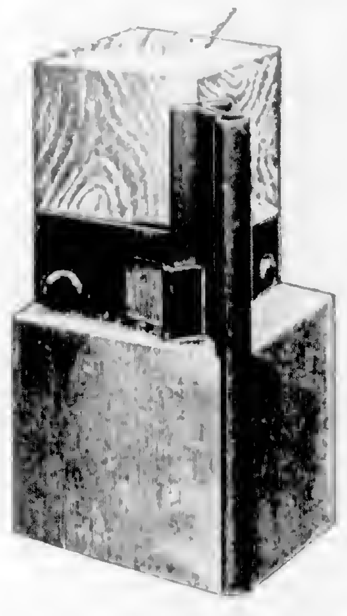

This Illustration shows the Bead after Plastering and speaks for Itself.

A Cornerbead That Protects

Among the many such inventions now on the market there is none so positive in results, simple of operation, and so satisfactory from every point of view as the Parker steel cornerbead.

This bead furnishes the strongest protection to the plaster corner, gives just the right grounding and is a guide for the plasterer in making a plumb, straight angle. With its peculiar shape the plaster is not thin and feather-edged when it joins the metal, and so does not crack and flake off.

A very important point in favor of the Parker bead is that the steel is perfectly protected from rusting by a heavy coating of zinc, put on by the hot galvanizing process. The electro-galvanizing process does not withstand the chemical action of hard plaster.

The illustration above shows this bead after plastering, and gives one a very good idea of the effective protection given corners.

The Robert W. Hunt Company

The Robert W. Hunt Co., inspectors, serves most of the great railway systems of the United States, Canada and Mexico, and most of the great companies and corporations of America which are either occasional or regular purchasers of building materials. It serves the National Government, and many of the individual States. Its main office is in Chicago, but it maintains branches in London, New York, Pittsburg, San Francisco, St. Louis and Montreal. It has on its rolls a large corps of experts, distributed among all the large mills, foundries and fabricating shops of this country and Canada, and also at the principal mills of England, Germany and Belgium.

"Robert W. Hunt & Company" inspections are regularly specified in the contracts prepared by many of the eminent engineers and architects of this country. Among the recently erected structures in New York City the materials for which were tested by them, are the Singer building, forty-two stories in height, and the Metropolitan Life Insurance building, with its fifty stories, the tallest buildings in the world. In Chicago, recently constructed buildings of which they inspected the materials are the La Salle hotel, the Commercial National Bank, and the new City Hall. In the new San Francisco, their inspections have covered the steel in the new United States Custom House, the Alaska Commercial building, the Home Telephone Company's building, and the Palace Hotel, besides smaller structures.

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Architects, builders and owners who are interested in the use of sanitary wall and floor tiling will do well to visit the show rooms of Messrs. Kirwan & Donovan, at 159 Fifth street, just below Mission street, San Francisco. The members of this firm are veterans in the tile business and were formerly with the Bush & Mallett company. They have one of the largest and most complete show rooms on the coast, as a glance at the photograph shown on this page will indicate. Besides carrying an extensive line of tiling for walls and floors Kirwan & Donovan have quite a large stock of clincker brick, pressed brick and fire tile mantels. The tile most in demand is that used for floors in hotel lobbies and saloons.

Recent work contracted by this firm includes the tile floor in Frank Maskey's store, thirty-two fire tile mantels in the Kellogg apartments, C. A. Meussdorffer, architect; Marvin Estate building, sanitary walls and floors in the Lane hospital and Mrs. Doe's residence at Octavia and Washington streets. Kirwan & Donovan also make a specialty of a very handsome white enamel satin finish tile for bath rooms.

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Problem of the Interior Decorator

One of the most puzzling problems with which the interior decorator and architect has to deal is the designing of fixtures for modern illuminants which shall harmonize with and carry out the spirit of the decorations of former "periods." This difficulty arises from the fact that in these by-gone periods artificial illumination was practically limited to the candle. The very presence of an electric lamp and such surroundings is in itself an anachronism. The problem is usually attacked along the lines of least resistance, which is the simple imitation of a candle in a more or less imperfect way. The use of glass chandeliers offers a method of solving such problems well worthy of the most careful consideration. Glass has existed for many centuries, and as material is therefore not incongruous with any period. Furthermore, its use in fixture ornamentations is essentially in the form of jewels, depending upon the brilliant points of light produced by reflection, and the prismatic colors due to refraction and dispersion, for their decorative effect. Diamonds are always in good form, no matter what may be the prevailing style of dress; and the faceted or prismatic glass pendant is equally beautiful and appropriate, no matter what particular period the furnishings or decoration may be in.

Can Restore Boom Times.

During the boom labor had something of a scarcity value, and naturally the workman, through his union, made what he thought was the best bargain for himself. He became thereby one of the most important contributory causes for the panic. The workman, and he principally, can restore boom times by the creation of new wealth. The capital to run a great boom is simply the surplus of created wealth over that part of it which must be consumed to maintain the producer. It is the employment of such wealth which finances the boom, and it is the absorption of this wealth in fixed forms, or its waste by fire, flood, war, or other causes, which checks the boom and produces the panic. In the long period following a world panic when such wealth has to be recreated, the workman, union or otherwise, has an admirable opportunity to study elementary economics.

An Irishman, out of work, went to a carpenter superintendent asking for work. The following conversation passed between them:

Superintendent—Can you do carpenter work?

Pat—Yes.

Superintendent—Can you make a Venetian blind?

Pat—Yes.

Superintendent—How would you do it?

Pat—Faith, Oi'd stick his eyes out wid me finger.

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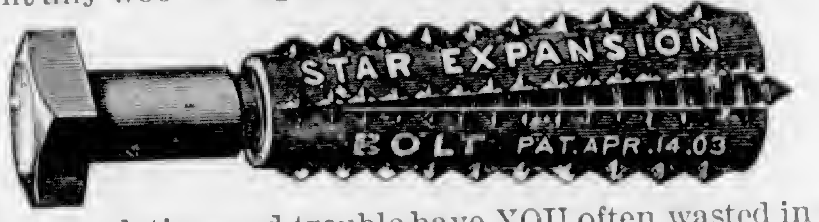

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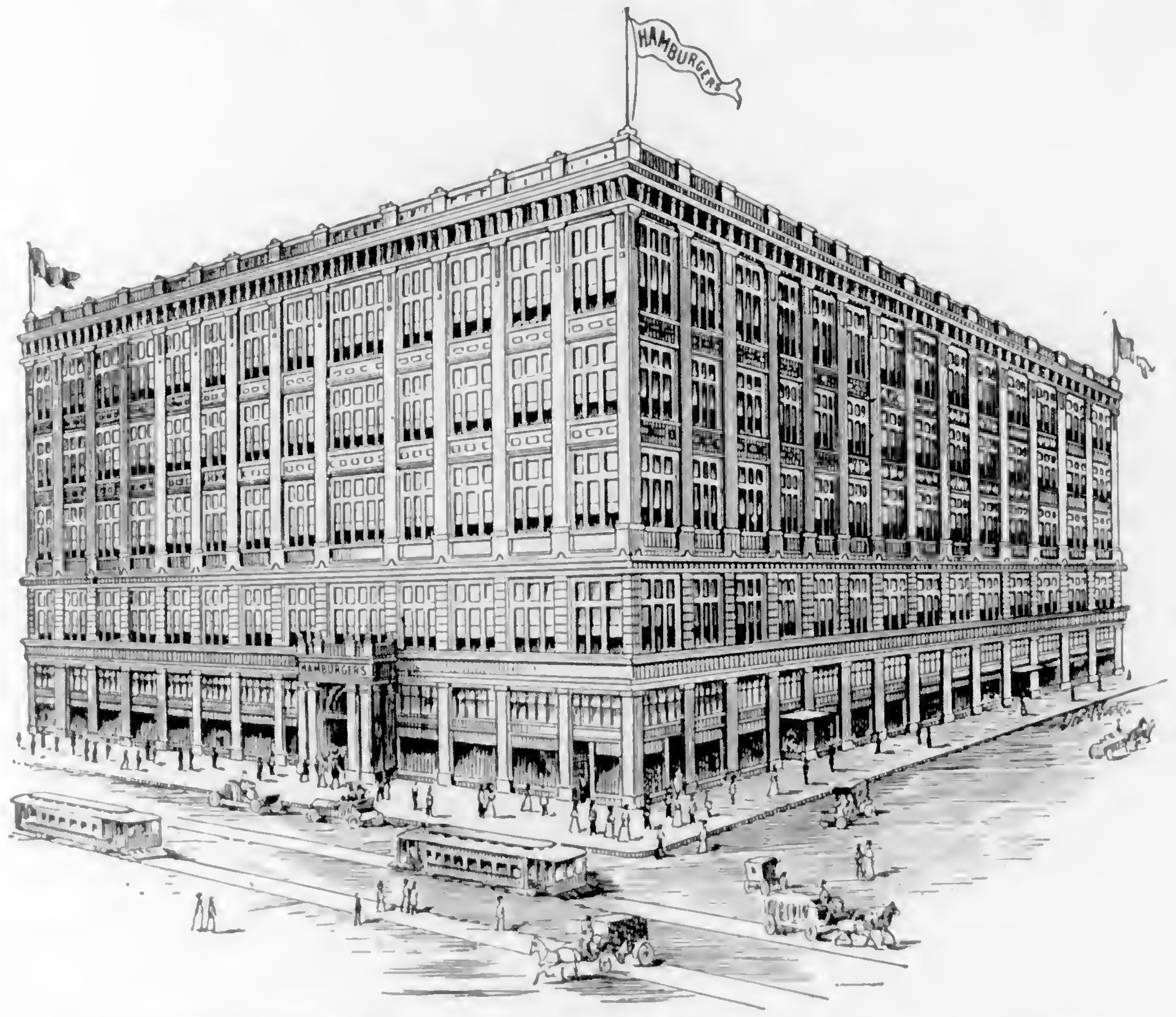

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United Materials Company

The United Materials Company have moved from 10 Third street, San Francisco, to a suite of well appointed offices in the Balboa building. Mr. Rochester, who was formerly manager of the company, is now representing the Pacific Portland Cement Company in Portland, Oregon, and he is succeeded by J. L. Chattock, who is also the president of the company. The other officers are: W. S. Hoyt, secretary, and S. W. Smith, treasurer. The United Materials Company have taken over the business of the C. I. Waterproofing Company and will endeavor to secure the use of this high-class waterproofing preparation not only on reinforced concrete buildings but on brick buildings, it having been found to contain excellent preserving qualities for all kinds of masonry construction. Besides the waterproofing, the United Materials Company represents the Port Costa Brick Company, Stockton Brick Company, the California Brick and Clay Company, and the Oriental Hardwall Plaster Company. A contract has recently been completed for all the face brick on the Union League Club building, L. B. Dutton, architect, and an order is about to be filled for all the common and face brick to be used on the new Stewart building at Fifth and Market streets. Also the enamel face brick on the Elks' building, A. A. Cantin, architect. The partition tile of the Palace hotel and the Sacramento hotel is being furnished through the agency of the United Materials Company.

Safes for Apartment Houses

The Herring-Hall-Marvin Safe Company, 36-38-40 Second street, San Francisco. is making a specialty of small burglar and fireproof safes for apartment houses, the idea being to place a safe in each and every apartment. The safes are not large and they may be put in either before or after the building has been put up, but better results are obtained if the architect makes provision for the safes in his plans and specifications.

The Herring-Hall-Marvin Company, since the fire, has installed vaults in the following buildings: Bank of California, Bank of Italy, French Bank building, Central Trust building, Marine Savings and Trust building, American National Bank, Balboa building, Hibernia Bank, Phelan building, Mission bank, and the Bank of Watsonville, Salinas City Bank and the Bank of San Jose.

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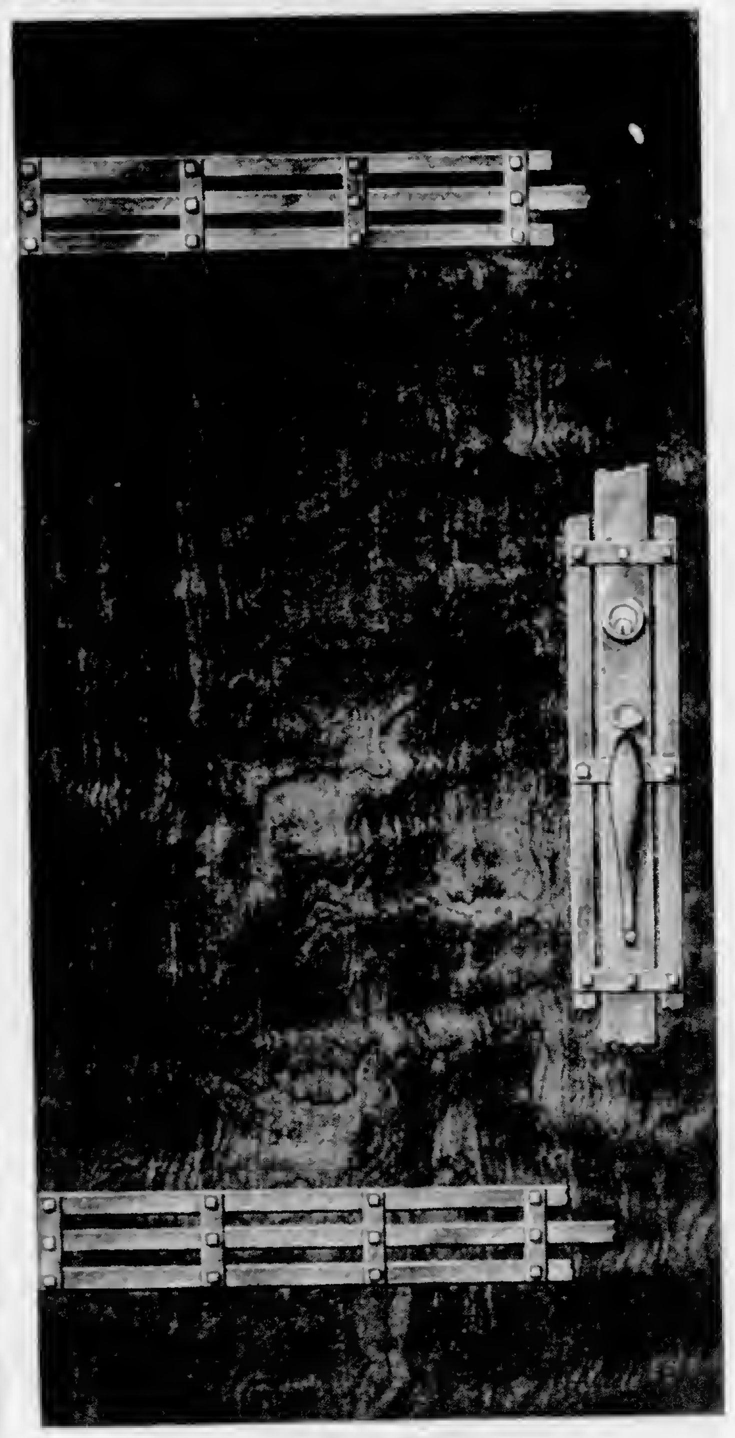

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So many cheap gas furnaces and clothes dryers have been put on the market that the architect and public are beginning to believe that they are a failure, as the condensation from gas will eat through everything but cast iron and aluminum steel. That is why the Sterling is being sold at a higher price.

What is a home with fine bath rooms, fixtures, furniture, etc., if you have to wear furs and overcoat to keep warm? Don't blame the cheap furnace—blame yourself. Let your architect select the best furnace at the most reasonable price.

The Sterling may cost a little more at first, but at the end of five years you still have a gas furnace. The Sterling is the only gas furnace on the market that will not rust or burn out.

The manufacturers will gladly furnish a list of companies that handle or make gas furnaces if you will promise to investigate.

The Sterling gas furnace is sold by agents in Oakland, Los Angeles, and other large cities. Gas Furnace Company, 226 Oak street, San Francisco, is where it is made.

Proper Lighting for a Household

The interior illumination of the household is still being given a great deal of study. The public is not educated sufficiently in respect to the proper protection of the eyes against faulty artificial lighting, but it is very tender with regard to the amount of the lighting bill. The adaptation of the different kinds of lights, so that at the one time the eyes are safeguarded, desired decorative effects are obtained, and light is not wasted, should be a profitable line of study for those identified with house lighting.

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